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A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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VOLUME IV.

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VOL. IV. No. 72.

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West Indian Agricultural Conference, 1905.

THE Fifth West Indian Agricultural Conference was opened in the Council Chamber at the Princes' Buildings, Port-of-Spain, Trinidad, on Wednesday, January 4. His Excellency

the Governor (Sir Henry M. Jackson, K.C.M.G.) extended a hearty welcome to the Representatives in behalf of the colony.

In opening the Conference, the President (Sir Daniel Morris, K.C.M.G.) congratulated the Representatives on being able to meet in so important and progressive a colony as Trinidad, and expressed his deep appreciation of the assistance rendered by the Government and the members of the Trinidad Agricultural Society. He expressed the belief that he was justified in stating that they had gained the confidence and support of all the prominent men who represent the practical side of agriculture. As the latter were working side by side in hearty co-operation with the scientific side, the results of their labours could not be otherwise than beneficial and of a lasting character. The Representatives would observe that there was a long list of subjects proposed to be dealt with, but, as on former occasions, chief attention would be devoted to those of immediate interest and such as had a direct bearing on the improvement and development of the staple industries of these colonies. A prominent position was given to questions affecting the sugar industry, and a review of the results obtained in recent years in raising varieties of canes yielding more sugar and less liable to disease would show that an appreciable advance had been made in both directions.

The prospects of the sugar industry were more favourable than they had been for many years and it was realized that the West Indies, after the strenuous efforts made in their behalf, had at last obtained

a position which should enable them to compete, in the British market, on equal terms with all sugar-producing countries.

Sir Daniel Morris then referred to some of the results of the experiments with sugar-canes throughout the West Indies. In British Guiana there were at the present time 13,000 acres planted in canes other than Bourbon, the results of experiments having indicated an increased yield per acre of from 12 to 20 per cent. over that of the Bourbon. At Barbados the general results of the seedling experiments justified the opinion that the raising of seedling canes afforded special promise of increasing the yield and diminishing the cost of production. The area under seedling canes was gradually extending. At Antigua where there were about 8,000 acres under cane cultivation, the area under Bourbon had been reduced to 204 acres. Similarly at St. Kitt's, seedling canes—especially B. 147 and B. 208—occupied a much larger area than the Bourbon, which was at one time so seriously attacked by disease that fears were entertained that some estates would have to abandon sugar-cane cultivation.

As Trinidad was the largest cacao-producing area in the West Indies, it was proposed to devote special attention to the circumstances of that industry. A review of the cacao industry had recently been published in the *West Indian Bulletin* (Vol. V, pp. 172-7), a short summary of which was to be found in the *Agricultural News* (Vol. III, p. 305). From that information it would be seen that cacao plantations were being very considerably extended throughout the West Indies.

The first of the recent experiments in cotton growing was started at St. Lucia in 1900. In the following year these experiments were extended to Barbados and the northern islands. The total area planted in all the islands in 1902 was 500 acres. This was increased in 1903 to 4,000 acres. During the year 1904 the area planted in Sea Island cotton, and now coming into bearing, was 7,243 acres, and in other varieties 4,438 acres, making a total of 11,681 acres. Valuable assistance had been rendered by the British Cotton-growing Association in making grants of money and machinery, in finding the best market for shipments of cotton, and more recently in arranging for the visit to the West Indies of Mr. E. Lomas Oliver. The Imperial Department of Agriculture had supplied 35,700 lb. of seed of the best variety of Sea Island cotton at cost price. There were at the present time in the West Indies

fifteen well-equipped cotton ginneries in working order. The prices obtained for West Indian Sea Island cotton during the past season had ranged from 12*d.* to 18*d.* per lb., the average price being 14½*d.* per lb. It was now recognized that West Indian Sea Island cotton is an article in high demand, and the industry showed every promise of being established on remunerative lines. It was probable that the crop of Sea Island cotton to be reaped from the present time to May next would reach 5,000 bales of the value of £100,000.

The success that had attended the establishment of the fruit trade at Jamaica had naturally suggested similar efforts in the other islands. There were numerous difficulties connected with the transport of fruit from these colonies, and it would probably be some time before shippers would be in a position to obtain all their requirements. The first step that was necessary was to grow the right kind of fruit and produce it in such quantities and in such a condition as to meet the requirements of the market. Afterwards, when the trade had assumed large dimensions, the Royal Mail Company might see its way to provide special steamers fitted with cool chambers capable of delivering large cargoes in good condition.

Sir Daniel Morris then proceeded to review the situation as regards the lime, sisal hemp, rubber, tobacco, and other industries. Reference was also made to Agricultural Shows, to the progress made in connexion with Agricultural Education, and to the dissemination of agricultural knowledge by means of official and other publications.

MILK-POWDER FACTORY IN FRANCE.

The U. S. *Monthly Consular Reports* for August 1904 contain the following note:—

One of the many opportunities for the investment of American capital in this part of France has been seized upon by certain American interests, combined with local French enterprise, in the establishment of a factory for reducing milk to powder. The company is known as the H. M. Mott-Smith Company, or Société de Lait Solidifié Française. The factory will be in operation in a few weeks and will employ the Juste-Hatmaker process for evaporating and sifting milk. The capacity of the factory is 2 tons of powdered milk a day, which represents about 5,000 gallons of fresh milk. The product is destined both for domestic and foreign consumption. The factory is located in the midst of a very important dairy district, and the chocolate manufacturers in the neighbouring cities are preparing to profit by its presence.

According to the *Experiment Station Record*, it is stated in the *Rev. Gén. Lait* that the powder prepared from whole milk at the co-operative dairy at Oostcamp contained 3.62 per cent. of water, 5.67 ash, 26.75 fat, 32.86 casein, and 31.10 lactose.



SUGAR INDUSTRY.

Seedling Canes in British Guiana.

	1904			Av.	1903			Av.	1902			Av.	1901			Av.
	Acres.	Tons.			Acres.	Tons.			Acres.	Tons.			Acres.	Tons.		
Bourbon	2,912.208	6,735	2.31	2.31	2,791.062	6,464	2.31	2.31	2,791.062	6,464	2.31	2.31	2,912.208	6,735	2.31	2.31
Seedlings	1,073.082	3,215	2.99	2.83	1,879.267	5,331	2.83	2.83	1,317.277	3,706	2.81	2.81	1,073.082	3,215	2.99	2.83
Total	3,985.290	9,950	2.49	2.62	4,670.329	11,800	2.62	2.62	4,108.339	10,170	2.47	2.47	3,985.290	9,950	2.49	2.62
Seedlings better by	...	...	...	31 per cent.	...	...	...	14 per cent.	...	...	...	21 per cent.	...	...	...	29 per cent.

On p. 180 of volume III of the *Agricultural News* information was published in regard to the experimental cultivation of seedling canes at Diamond plantation, British Guiana. Through the courtesy of the manager, Mr. John M. Fleming, we are now in a position to supplement this with the following particulars for the 1904 crop:—

Taken with the results for the three previous years, this goes a long way to prove that in the propagation of cane from seed lies a ready means of obtaining varieties superior to the Bourbon which is the variety hitherto grown in Demerara.

As the result of experiments carried on for four years (1901-4 inclusive) it will be seen that seedling canes grown on 1,537.918 acres as compared with Bourbon canes grown on 2,824.352 acres have proved better than the Bourbon to the extent of 24 per cent. The average crop reaped during the period under review was 10,560 tons.

Price of Sugar.

The following extract from *The Times* of December 3 gives the views of one of the leading firms of refiners (Messrs. Henry Tate & Sons) as to the causes that have led to the present rise in the price of sugar. They also express the opinion that probably in a few years prices will be appreciably lower owing to the increased production both of cane and beet sugars:—

It is true that the consumption on the Continent showed a very large increase last year, owing to the reduction of the excise duties, but it must be remembered that a considerable quantity must have gone to fill up the invisible supplies which are usually kept on hand by traders, and

which were practically nil in October last in anticipation of lower prices. It is more than probable that consumption abroad for the next twelve months will be apparently less. If, however, the present beet-root crop had come up to the expectations, there would have been sufficient sugar to meet all requirements. We, just as much as the confectioners and jam manufacturers, are wishful to have cheap sugar, and we have no doubt that the Brussels Convention will be eventually the greatest factor in obtaining this result.

We go further and assert that, had there been no Convention, we should have been paying shillings per cwt. more for sugar than at the present moment owing to the fact that the cartels of Germany and Austria would have been able to demand whatever prices they pleased. As it is, we are already seeing a large increase in the production of cane sugars, which, in a few years, will bring us to as low, if not lower, prices than we have hitherto been accustomed to.

The following extract from a letter from Mr. C. Czarnikow, the well-known sugar authority, also from *The Times* of December 3, discusses the point whether the Brussels Convention was, in any way, concerned in causing the recent rise in the price of sugar:—

The Convention had nothing to do with the shortage [in sugar]. Germany and Austria had sown larger areas than last year; it is wind and weather that have produced 800,000 tons less sugar on almost the same acreage, but the Convention has procured for the world 400,000 tons more cane sugar this season, without which we should have seen much higher prices. Therefore, it has distributed production more evenly over the world's surface, including our own colonies, substituting natural for unnatural conditions, and has changed a curse into a blessing by emancipating us from the bondage of State subsidizing supplies, which would have led to a monopoly detrimental in the extreme to this country.

SEA-WEED AS MANURE.

The following note on the use of sea-weed as a manure is taken from the *Gardeners' Chronicle* of December 3, 1904. For previous notes on this subject see *Agricultural News*, (Vol. III, pp. 5 and 279):—

In the Channel Islands sea-weed is regularly gathered in large quantities and spread over the potato fields, and the farmers there find it a most valuable manure. It is either scattered on the ground fresh from the sea or burnt in kilns, and the ash used instead of the raw material. At the sea-side in this country sea-weed is often brought up from the beach in carts and spread over the land, with very good results as regards the corn, but no effort has hitherto been made to burn it in a kiln. Surely this could be done without much difficulty and with great advantage to the public, for in this form iodine manure could be put upon the market for the use of gardeners. Of course, the object of burning the sea-weed is to get rid of the smell, and, to enable it to be kept in a portable form, it could be put up in barrels for wholesale use, and in tins for selling in small quantities. There are many places along the coast where the industry could be started—anywhere, in fact, where sea-weed is plentiful, and the expense of tinning would not be great. We should thus gain an excellent fertilizer, which is, moreover, said to be particularly good for roses.

In districts near the coast it is advisable to make use of sea-weed as a litter or for mulching, rather than to burn it, on account of its value as a humus-producing material, humus being especially likely to be deficient in tropical soils.



WEST INDIAN FRUIT.

PICKING AND MARKETING ORANGES.

The following directions with regard to picking oranges and preparing them for market are taken from Bulletin No. 4 of the Porto Rico Agricultural Experiment Station, to which reference was made in the *Agricultural News* (Vol. III, p. 404):—

The fruit should never be pulled off, but should be separated from the branch by clipping the stem about $\frac{1}{8}$ inch above the fruit. The picked fruit should never be dropped to the ground, but gathered in a sack or cloth-lined basket carried by the picker, and should then be emptied into shallow boxes or baskets. The fruit should always be handled as carefully as possible, remembering that every bruise may cause decay.

The appearance of the fruit when ready to pick will vary with each variety. It may be said, however, always pick before fully coloured up, but never so early that the fruit will not ripen *en route*, as a green orange will never sell well, regardless of other qualities.

Picking should never be done on a rainy day nor in the morning before the dew has dried. The fruit should always be 'cured' (that is, the surplus water in the rind should be allowed to evaporate), which may be done by storing in a well-ventilated house. The ideal way for this drying would be to spread the fruit out on shelves or on the floor so as to facilitate evaporation. That, however, is not practicable, as it necessitates extra handling, which will bruise the fruit more or less, as well as increase the amount of work. The boxes or baskets containing the fruit may be removed from the field and stored in such a manner as to leave ample room for ventilation. If the surrounding air is fairly dry, two or three days will usually be sufficient for curing; otherwise, more time may be required.

Every variety of fruit should be kept separate. Seedling trees should be graded according to the quality of fruit and given a number or mark. All the trees bearing fruit of the same quality should receive the same mark. The fruit from trees with different marks should be kept separate through the subsequent processes, and may then be packed like distinct varieties.

Oranges should be packed in boxes of standard size. The ones used in Florida are $12\frac{1}{2}$ by $12\frac{1}{2}$ by 27 inches, outside measure, with a partition in the middle. The packer should carefully examine every fruit and discard any that is in the least bruised, discoloured, or deformed. The fruit should then be wrapped in tissue paper, which is sold especially for that purpose, and carefully packed in layers. The top layer should project about $\frac{3}{8}$ inch above the sides of the box, which

will make the packing solid after the cover is nailed on under pressure. Every box should be stencilled on the end, stating the number of fruit, the grade or variety, and, if possible, the packer's name and address.

BANANAS IN HAWAII.

A paper by Mr. J. E. Higgins, Horticulturist, dealing with the banana in Hawaii, is published as Bulletin No. 7 of the Hawaii Agricultural Experiment Station. The writer acknowledges assistance obtained from the paper by the Hon. Wm. Fawcett (*West Indian Bulletin*, Vol. III, pp. 153-7) dealing especially with methods of cultivation.

Mr. Higgins' paper deals fully with the culture, diseases, insect enemies, etc., of the banana, and concludes with a botanical account of the banana containing information drawn largely from an article in the *Kew Bulletin*, 1894, pp. 229-314. The following notes on varieties, more especially those of a peculiar habit of growth, are of interest:—

Jamaica Variety.—Introduced [into Hawaii] early in 1903, by Mr. Philip Peck, of Hilo, and again by the Board of Agriculture and Forestry at the close of the same year. It has received many names from the places where it has been grown. It is the chief banana of the American trade; excellent for shipping, fine in appearance, of fair flavour, with fruits well placed on the bunch for convenient handling. The plants are large. This is the banana for the millions.

Borabora banana.—This is *Musa Fehi*, which is common in the forests of Tahiti, and was probably brought to Hawaii from Borabora, an island of the same group. The peculiarity of this variety is that the scape or stem of the bunch stands erect, holding the bunch straight up instead of hanging over as most bananas. The fruit is oblong, nearly straight, sessile, and of fair quality when cooked.

Hua Moa (Hen's Egg).—The plant is of medium height, the petioles long and slender. There are rather more leaves in the rosette than most other varieties have. The scape is very slender. The fruit is nearly as great in diameter as in length. There are often only two or three fruits per bunch. It is of very superior flavour.

Maia Hua Alua.—Sometimes called 'Mahoe.' The peculiarity of this variety is that it produces two bunches of fruit from the same stem.

Maia Hapai.—This is one of the most curious forms in the islands; probably Subang or Eel plantain of Java. It ripens its fruit within the stem.



COTTON INDUSTRY.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop:—

From Montserrat Mr. Jordan reports two pickings from the plot at Grove Station since his last report. Picking was general, and it was estimated that some 20,000 lb. of seed-cotton had been picked to date. The cotton worm was being kept in check, but the 'black boll' had shown signs of spreading.

The cotton fields inspected by Mr. Shepherd in St. Kitt's were in a promising condition. There were signs of attacks of pests, but as every attention was being given by the planters, little damage was anticipated.

Mr. Sands reports that in St. Vincent 82,110 lb. of seed cotton had been picked, and that picking was in full swing. The report of the Emergency Officer shows that the general condition of the crop was good.

Indian Cotton Seed Cake.

The following notes are abstracted from a report by Professor Douglas A. Gilchrist, M.Sc., Director of the Northumberland County Demonstration Farm, on 'Feeding Experiments with Indian Cotton cakes':—

Last autumn, Mr. James Mollison, Inspector General of Agriculture in India, sent to Hull ten lots of about 1 ton each of Indian cotton seed, which had been grown in different parts of India. The objects were to ascertain the comparative values of rough cotton cake from cotton seed grown in different districts, and to compare the amounts of refuse, oil, and cake produced from different lots of seed. He also desired that a comparison should be made of the feeding returns obtained in (a) ordinary rough or *undecorticated* cake, (b) *delinted* cake from which as much as possible of the fuzz, or cotton which adheres to Indian cotton seed, has been removed from the seed before crushing, and (c) *decorticated* cake from which the husks or hulls and cotton have been removed from the seeds before crushing. The cakes produced from the different lots of Indian cotton seed were placed at the disposal of the Cockle Park Committee by the Indian Government.

Some of the practical results of the experiments were as follows:—

1. That Indian (Bombay) rough cotton cake, when of good quality, gives satisfactory results with stock fed indoors or on pasture, and that its high manurial value makes it a desirable manurial agent, especially for improving poor pasture. For this latter purpose it is giving good results at Cockle Park.

2. It is most desirable that cake produced from Indian cotton seed which has been damaged while being harvested, or during storage or transit, should be branded as such, and that damaged seed should not be mixed with good seed before being crushed. The Indian Government and seed crushers should combine to deal with this matter. Meantime, purchasers of this cake should always have samples examined by an expert before completing the purchase.

3. The cake produced from Indian cotton seed which

has been delinted has probably a considerably higher value for feeding than ordinary Indian cotton cake. The production of cake from delinted seed is well worth the attention of seed crushers.

Barbados Cotton Central Factory.

The Committee appointed at a meeting of the Agricultural Society on February 6, 1903, to co-operate with the Imperial Department of Agriculture for the West Indies in its endeavour to establish a cotton industry in Barbados, has submitted the following interim report:—

The report now submitted covers the period from January 25, 1904, when the Cotton Central Factory was re-opened by his Excellency the Governor, Sir Frederic M. Hodgson, K.C.M.G., to November 31, 1904.

The building now used as the Cotton Central Factory was originally built in Christ Church at a cost of £283 10s. 6½d., for a small-pox hospital, but was never used. This building was loaned by the Governor-in-Executive Committee to the Imperial Department of Agriculture. The Legislature then voted £370 for moving the building to the Pier Head, building the foundation, and erecting the machinery, etc. Of this sum £363 2s. 10d. was expended. The balance £6 17s. 2d. lapsed into the Treasury at the end of the financial year 1903-4. In addition, the British Cotton-growing Association made a free grant to the Cotton Committee of £100. They also loaned the Cotton Committee six gins and a baling press for which the Association may accept less than they originally cost. The British Cotton-growing Association have also, at the request of Sir Daniel Morris, recently loaned the Cotton Committee a disintegrator outfit, of the estimated value of £100, for crushing the cotton-seed.

The probable total cost of the Cotton Central Factory, it is estimated, will be £966. From this, however, must be deducted the £100 granted from the British Cotton-growing Association, leaving the cost of the Factory as £866, which in whole or part will eventually have to be repaid.

From the time the Factory was started in January, 1904, to the end of October, 360,978 lb. of seed-cotton have been ginned, yielding 104,923 lb. of lint and 251,383 lb. of seed. The lint obtained was 29.06 per cent. of the weight of seed-cotton ginned. The loss incurred during the ginning, due to the seed and lint drying and to the dust, etc., in the cotton and lint, amounted to 4,672 lb., or 1.30 per cent. of the weight of seed-cotton. The lint was made into 378 bales, weighing on the average 277.6 lb. each, of which 362 were shipped by the Factory and 16 delivered to the owners or their agents. The receipts from ginning the 104,923 lb. of lint at 3c. per lb. are £655 15s. 4½d., the value of crushing the 94,361 lb. of seed at 6c. per 100 lb. is £11 15s. 11d., making together the total receipts of the Factory £667 11s. 3½d.

The expenses to the end of November amounted to £342 1s. 3d., leaving a balance at that date of £325 10s. 0½d. Of this it is proposed, in accordance with the decision of the Cotton Committee, to divide *pro rata* among the growers what was left after deducting all expenses for ginning, etc., £218 11s. 9½d., or 1c. per lb. of lint. This will leave on hand £106 18s. 3d.—sufficient to purchase new rollers, new shafts, walrus hide, to pay for the erection of the new baling press, to pay small sundry accounts which have not yet been received, and generally to put the Cotton Central Factory in as good a condition as it was at the beginning of the last season, leaving a small balance on hand estimated to be about £30.



POULTRY NOTES.

In the *Agricultural News* (Vol. III, p. 343) mention was made under 'Poultry Notes' of what is known as 'Pip,' which is due to the development of a hard substance on the tongue. In reference to this a correspondent writes from Surinam to the effect that the following treatment is adopted in that country:—

The hard substance is carefully torn off, and in a day or two the fowls are eating grain again. The fowl is laid on its back and the tongue is firmly held between the thumb and first finger of one hand; with the other hand, by means of a needle, the hard substance is loosened. After this it is seized between the thumb and first finger and cautiously torn away.

In reference to this subject, Mr. John Barclay, Secretary of the Jamaica Agricultural Society, writes:—

The treatment recommended in the *Agricultural News*, viz., to touch the tongue with glycerine, is good. This should be repeated twice a day. The treatment mentioned by your correspondent is also quite a common one here. It is heroic and also painful to the fowl, but, if carefully done, removes the growth without injuring the tongue.

Pip is caused by roup. When the nostrils are choked and the fowl breathes through the mouth, then the tongue gets hardened. If the fowl did not suffer from roup, there would be no pip, and if a fowl with pip were cured of its roup, the pip would disappear.

It may be mentioned that an identical treatment to that adopted in Surinam is practised in Barbados.

Varieties of Domestic Turkeys.

The following note from *Farmers' Bulletin* No. 200 of the U. S. Department of Agriculture, 'Turkeys: standard varieties and management,' is likely to be of interest to raisers of turkeys in the West Indies:—

Six standard varieties of turkeys are grown in the United States, viz., Bronze, Narragansett, Buff, Slate, White, and Black. The main differences are in size and colour of plumage. The Bronze and the Narragansett are the largest, the Buff and the Slate are the medium, and the Black and White the smallest. Of late so much improvement in size has been made in the Whites that they have moved up to contend for third position, some of them having passed the 30-lb. mark. The same statement may soon be made of the Blacks, as they have greatly improved during the last few years.

In addition to the foregoing, there is a non-standard variety known as the Bourbon Reds. They might well claim the position now held by the Buff turkeys, being quite like them and more often grown for market than are the Buffs.

MANUFACTURE OF COPRA AND COCOA-NUT OIL.

The following note on copra and cocoa-nut oil, by the Consul-General at Marseilles, appeared in the *U. S. Monthly Consular Reports* for August 1904:—

The merchandise known as copra is the meat of the cocoa-nut, from which oil is extracted in all countries where the cocoa-nut palm grows. The same material is shipped in large quantities to Marseilles. The nut is broken by hand, the meat is extracted and either dried in kilns, as in the Philippine Islands, or in the sun, as in Cochin China. The oil is generally used for the manufacture of soap, but of late years methods of refining it have been perfected, with the result that a considerable proportion of the Marseilles oil is now sold for alimentary purposes.

The inquiry as to the cost of working copra is difficult to answer satisfactorily. The Marseilles manufacturers have made very large profits during the last four or five years. This has been true of manufacturers of all grades of vegetable oils as well. In a period of general stagnation, the best-equipped manufacturers have made handsome fortunes in a single year. The present cost of copra in Marseilles is: Ceylon, \$85.16 a ton; Manila and Singapore, \$83.94 a ton.

Copra is not treated to a first and second pressing as are most oil seeds. The raw material is first passed through a cylinder press, very much as paper is fed from an endless roll through the revolving cylinders of a printing press. The pulpy mass issuing therefrom is then treated in a box press, and no distinction is made between the oils resulting from the two processes. The high-grade oils are obtained by clarification and filtration, in regard to which little really satisfactory information can be obtained. The method was guarded as a secret by one firm for some time, but at present several firms claim to be turning out equally good edible oil.

From 62 to 63 per cent. of oil is obtained from the raw material. Two hundred pounds of copra properly handled should produce approximately 124 lb. of oil and 74 lb. of cake. The ordinary soap oil is now quoted at \$12.82 for 220 lb.; the best Cochin oil at \$13.89 for 220 lb. Copra oil cake is very seldom treated by chemical process, as it finds a ready sale for stock-feeding purposes. White copra cake is now worth \$3.04, and ordinary cake \$2.31 for 220 lb.

A further note from the same publication on the trade in cocoa-nut oil in the Netherlands is of interest:—

Cocoa-nut oil, as far as I have been able to ascertain, is not manufactured in the Netherlands, but comes principally from British India. The kernel of the cocoa-nut in a dried state is also exported to Europe under the name of 'copra.' The oil is extracted probably by steam-heating or cooking, and subsequent pressing. In Europe it is manufactured at Harburg, Germany.

The Netherlands' imports and exports of cocoa-nuts, copra, and cocoa-nut oil are not enumerated in Dutch official statistics. I have been informed, however, that the arrivals of copra in the Netherlands amounted to 800 tons in 1902, while there seem to have been no arrivals in 1903.

Cocoa-nut oil prices ranged in 1902 between \$15.60 and \$12.80 for 100 kilograms (220 lb.), and in 1903 between \$13.70 and \$11.40 for 100 kilograms, duty paid and inclusive of barrels. The duty on cocoa-nut oil in the Netherlands is 22c. on 100 kilograms. Copra prices ranged in 1902 between \$9.60 and \$7.80 for 100 kilograms (200 lb.). Copra is free from import duty in the Netherlands.

BUDDING TROPICAL FRUIT TREES.

The following notes on the budding of mangos, cacao, naseberries, avocado pears, and nutmegs are taken from the Annual Report of the Director of Public Gardens in Jamaica for 1903-4:—

MANGOS.

Several years ago it became apparent that an enormous export trade in mangos might be built up in Jamaica, if it were possible to bud over the thousands of trees bearing crops of inferior fruit on the dry southern plains. The tedious method of grafting or inarching had been practised for a considerable time past, resulting in the distribution of a large number of young trees, but it was not until last July that an absolutely reliable method of budding was discovered; though, previous to that, several of the buds put on during the experiments had taken and grown.

One of the trees budded at Hope is a stump not less than fifty years old; twenty-five buds were put on in July last, and all grew, each resultant shoot being now between 4 and 5 feet long, with the usual side branches; if only one had been put on it would have made just as much growth as the whole twenty-five put together. Trees of all sizes were budded, but it was found that, as a rule, the larger the trees the more readily and rapidly the bud grew.

Without doubt the quickest way to establish a mango orchard would be to transplant the stumps of trees, say, 6-8 inches in diameter previously cut down to within 3 feet of the ground; one was so treated at Hope and squeezed into a tub where it has made, in a month or so, more growth than a seedling would in two or three years; the shoots that have sprung out of this stump will be budded with several of the best East Indian varieties and reserved for experiments in hybridization.

CACAO.

The success achieved in the experiments on the budding of cacao ought to have an enormous influence on the yield and the quality of the bean. Trees yielding inferior varieties and small returns may be budded with the best variety. It is a remarkable fact that the most valuable variety, the white criollo, has the most delicate roots, whilst the inferior calabacillo has the strongest roots; I have seen trees of both growing together—the criollo nearly killed by the hurricane shaking the roots and the calabacillo and a few trees of forastero looking as though they had benefited by it. There is every indication of the criollo proving weak only when on its own roots; and the budding of it upon forastero and calabacillo at Hope has, so far, proved this to be so. Mr. T. J. Harris brought some bud-wood of criollo from Westmoreland and worked the buds on stocks of forastero and calabacillo that had previously been prepared; these are growing out in the full sun and, three months after budding, are 3 feet high and are beginning to branch at the top.

The method employed in budding is so reliable that out of dozens put on by the apprentices and Industrial School boys not a single one has failed to grow.

NASEBERRIES.

It is well known that throughout the island there are isolated naseberry trees much prized by the owners on account of the superior quality of their fruit; these trees are the result of accidental variation and, to a slight extent, natural selection.

Hitherto it has been impossible to lay out a naseberry orchard owing to the extreme uncertainty as to whether the seedlings will bear fruit of the same quality as the parent, or, in other words, it has been impossible to obtain a large number of young trees of one good variety; experiments

have therefore been conducted in the budding of this valuable tree, resulting in complete success.

Trees bearing inferior fruit may be cut down and the shoots that spring from the stem budded with buds from the tree bearing superior fruits in the same way as mangos.

AVOCADO PEARS.

The one tree that survived the hurricane, budded two years ago, is now 4 feet high and flowering freely. Though the operation of budding is so very simple, nothing has been done by the country-side in the way of establishing a pear orchard of the one or two good shipping varieties. Nothing would be easier or more remunerative than the shipment of pears to America. The method employed in budding citrus is the one to be employed in this case.

NUTMEGS.

Several years ago experiments were conducted with a view to bringing the nutmeg plant under some control; it has been found that a variable percentage of seedling trees prove, after many years' waiting on the part of the planter, to be male or non-bearing trees, and that the female or bearing trees vary very considerably, some producing nuts that require 110 or 120 to weigh a pound, and others yielding nuts that weigh sixty to the pound; the latter, of course, being the more valuable. A number of trees were successfully grafted, but the subsequent growth of the scions in a somewhat horizontal direction indicated that they would never make good trees; it afterwards became clear that, if erect trees were to be obtained, the vertical shoots from the main stem must be used as scions. To this end several trees were cut down and others partially ring-barked to make them push out vertical growths, which were afterwards grafted; though this method was successful, it proved to be an extremely tedious and unprofitable one. Attention was next turned to the possibility of budding, and the method employed in budding cacao was applied to the nutmeg, with immediate success; it is now possible to get the nutmeg completely under control.

RUBBER IN THE GERMAN COLONIES.

The following extracts from the *Consular Report* on the trade of the German Colonies in 1902-3 indicate the progress that has been made in the cultivation of rubber-yielding trees:—

The native production of this article in German East Africa was 463,045 lb., valued at £51,331 in 1901, and 561,810 lb., valued at £59,230 in 1902. The exports were worth £59,229 in 1902 and £51,330 in 1901, or an increase in value in 1902 of £7,899 worth.

In the Cameroons, it is stated that the production of India-rubber is extending, but the methods of collecting are destructive and require to be controlled. The value of the exports in 1902 was £69,454, and in 1901 £85,476, or a decrease in 1902 of £16,022.

The German East Africa Plantations Company at Lewa continues to extend its plantations of rubber trees (*Manihot Glaziovii*), and at the end of 1902 they had reached 250,000 in number. The amount of rubber produced has hitherto been small.

The value of the exports of India-rubber from Togoland in 1902 were £17,967, and in 1901 £12,963, or an increase in 1902 of £5,004.

The general position of the rubber plantations in the Bismarck Archipelago and Kaiser Wilhelmsland on January 1, 1903, was 704 acres of *Castilloa elastica* planted, on which 1,170 trees were yielding rubber, and 425 acres of *Ficus elastica*, on which 471 trees were yielding rubber.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 15 of this issue.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue contains a short summary of Sir Daniel Morris' presidential address at the fifth West Indian Agricultural Conference.

The two short reviews on the sugar market (p. 3) are worthy of careful consideration by planters. The table showing the excellent results obtained with seedling canes at Diamond plantation, British Guiana, is of particular interest.

On p. 4 will be found an interesting note on peculiar varieties of bananas found in Hawaii. The directions for picking and packing oranges published on the same page should receive the careful attention of growers.

Several notes in regard to the cotton industry will be found on p. 5. These include a report on the Barbados Cotton Central Factory.

An account of useful work that has been carried on at the Hope Experiment Station, Jamaica, in connexion with the budding of tropical fruit trees is published on p. 7. Reference is made to the experiments elsewhere on this page.

Several interesting insect notes will be found on p. 10. These include an account of the Lime-tree Bark Borer.

A report by Mr. J. Russell Murray on West Indian produce in the Canadian market will be found on p. 13. On the same page is a table showing the amount and value of the imports of tropical produce into the United States.

Barbados Bananas for Egypt.

With reference to the note in the *Agricultural News*, (Vol. III, p. 252,) to the effect that at the request of his Highness the Khedive a consignment of bananas had been shipped to Egypt from Barbados, it may be mentioned that the safe arrival of these plants has been reported.

The shipment consisted of three wardian cases containing five varieties of bananas grown in Barbados, viz., the Dwarf or Chinese, the Jamaica or Gros Michel, the red banana, the fig, and the silk banana. The plants all arrived in good condition and were carefully planted with the exception of two which were dead.

Budding Tropical Fruit Trees.

It is desirable to draw attention to the extract on p. 7 of this issue of the *Agricultural News* relating to the useful work that has been done at the Hope Experiment Station, Jamaica, in connexion with the budding of tropical fruit trees.

It is shown that the process of budding can with great advantage be applied to the propagation of mangos, cacao, naseberries, avocado pears and nutmegs. It would appear that the application of this method to cacao promises to be particularly advantageous. Reference has already been made to this in the *Agricultural News* (Vol. II, p. 408), where mention was made of the fact that the Criollo variety was the most delicate and would only grow in very favourable situations, and it was stated:—

'As the superior value of Criollo cacao has undoubtedly been proved, it is suggested that planters will now be able to bud from Criollo trees on to the Calabacillo and Forastero trees already growing. A few Criollo trees can be grown on each estate, in favourable situations, to supply the necessary material for budding.'

Imported Stock for Antigua.

While in England recently the Imperial Commissioner of Agriculture obtained from the Royal Farms at Windsor six high-class pedigree animals for the Government Stock Farm at Antigua.

These animals arrived at Barbados on October 24 when they were inspected, before being trans-shipped for Antigua, by the Veterinary Surgeon attached to the Imperial Department of Agriculture, and found to be in good condition.

The following is a statement as to the animals—two bull calves and four Berkshire boars—signed by the Steward of the Royal Farms:—

One roan shorthorn bull calf 'Montrose.' Calved, January 28, 1904. Bred by His Majesty the King at Windsor. Sire, 'Lord of the Isles,' no. 83,953; dam, 'Moss Rose,' no. 67,585. Price, £26 5s.

One red Devon bull calf 'War King.' Calved, February 14, 1904. Bred by His Majesty the King at Windsor. Sire, 'Ben Golsmeott,' no. 4,343; dam, 'Whitstone Lonely,' no. 12,951, by 'The Vicar,' no. 2,156. Price, £26 5s.

Four pure-bred Berkshire boar pigs, about nine months old. Price, £21.

Pruning Cacao in Martinique.

The *West India Committee Circular* contains a translation of an interesting article on pruning cacao in Martinique, which appeared in the *Journal d'Agriculture Tropicale* of November 30, 1904.

The writer deals first with the removal of suckers. This work should be going on all the year, the suckers being removed as soon as possible after they appear, while pruning proper is necessary only once a year.

All dead wood should be removed, also the tips of any branches which have dried up from exposure to sun and wind. The crown of the trunk from which the main branches fork out should be cleared of small branches for some distance. Where squalls and hurricanes are of common occurrence, as in Martinique, it is advised not to let the cacao run too high, also to allow the trees to fork only once; the trees will then be protected by the wind-breaks.

It is suggested that a severe pruning of the branches might be accompanied by a partial pruning of the roots. It seemed to the writer that on one estate, in a rich soil, cutting the roots, as for example in making a ditch round the tree or turning over the soil with the spade, increased the production very considerably. The tree should be pruned as soon as it has finished bearing. Planters should avoid pruning a tree while the sap is rising.

Bermuda Biological Station.

The U. S. *Monthly Consular Reports* for August 1904 contain an interesting account of the establishment of a biological station at Bermuda. As the result of two expeditions of American scientists—one in 1893 and the second in 1897—organized by Professor C. L. Bristol, of New York University, the importance and feasibility of establishing such a station was suggested. The expeditions found an unexpected wealth of specimens and a climate in which work could be carried on during the summer months without risk of injury to health.

These expeditions have been continued year by year, and Professor A. E. Verrill, of Yale, has twice visited the islands and has published the first volume of a valuable work on the natural features of the Bermuda Islands. The second volume is to deal almost wholly with Zoology.

As a result, largely of the efforts of the American Consul, considerable progress has been made in the establishment of the station. The Colonial Government will purchase land and erect a building which will also provide a public aquarium. The Royal Society and the Carnegie Institution have made grants towards the objects of the project, while the New York and Harvard Universities are affording assistance by organizing a temporary laboratory in connexion with the Bermuda Natural History Society which has already commenced useful work. This Society was formed by a number of influential citizens in 1901.

Manurial Aspect of the Exports of Cacao from Trinidad.

The following is a short summary of an interesting paper, read before a recent meeting of the Trinidad Agricultural Society, by Professor P. Carmody, F.I.C., F.C.S., on the 'Manurial Aspect of our increasing Exports of Cacao':—

While it is most gratifying to record, from the point of view of the colony's progress and wealth, that the exports of cacao have gone on increasing till they now reach the large total of over 35,000,000 lb. per annum, it is necessary that cacao planters should not lose sight of the fact that this large exportation means a drain on the plant food of their estates. Cacao takes large quantities of the three most important and the most expensive ingredients in plant food, and a simple calculation will show that the annual shipment of phosphoric acid included in the cacao bean now exceeds 230 tons per annum, or over 300 tons of phosphate of lime. This can best be replaced by the use of basic slag which is the cheapest form in which phosphoric acid can be purchased at present.

The chief ingredients of plant food in 100 bags, each weighing 1½ cwt., are as follows: lime, 35 lb.; magnesia, 105 lb.; potash, 170 lb.; and phosphoric acid, 212 lb. Of these, potash is almost as expensive as phosphoric acid, and the necessity for replacing it should not be forgotten. Its most suitable commercial form is probably sulphate of potash. Magnesia is usually present in sufficient quantities in our soils.

Introduction of Cotton from the West Indies to the United States.

In an article in the *Demerara Argosy* of November 12, 1904 on 'Cotton in the Old Days: the past connexion of the West Indies with cotton planting in North America,' the Hon. N. Darnell Davis, C.M.G., makes some interesting observations on the early introduction of cotton from these islands to the United States. As early as 1641 the New Englanders shipped cotton from Barbados, and spun it into clothes. Again, it is reported that in 1675 cotton was obtained from the West Indies in return for food-stuffs.

Many of the early settlers in North America had previously been in the West Indies and they took with them a supply of seeds and plants as well as a knowledge of cotton cultivation. But, though the plant was cultivated in America, the colonists still continued to import cotton from these islands.

In 1786 seed of 'the best cotton in all the Indies' was sent from the Bahamas to Georgia. The plant adapted itself to the climate, and each year saw an extension of the cultivation of long-staple cotton in that state. The product of this plant, much improved by careful selection and cultivation, is now known as Sea Island cotton. This, too, is the cotton that has now been brought back to these islands from the Sea Islands of South Carolina by the Imperial Department of Agriculture. The product of this seed has, in some cases, been as fine as any cotton that has been placed on the market.



INSECT NOTES.

Crustaceans from Trinidad.

Specimens of a stalk-eyed Crustacean received at this Office from Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens, Trinidad, referred to in the *Agricultural News*, (Vol. III, p. 380,) have been identified at the British Museum (Natural History) as *Hippa emeritus*, Linn. Mr. Calmon, replying to the letter of the Imperial Commissioner of Agriculture, states that the species 'is widely distributed on the coasts of North and South America.'

Mr. Hart in a letter accompanying the specimens wrote that they were brought in by Mr. H. A. Nurse, Agricultural Instructor, from Cedros, and it is reported that the peasants use them for food. They are about $1\frac{3}{4}$ inches long and resemble the prawns and shrimps in the appearance of the carapace (*cephalothorax*), and the crabs in the structure of the tail (abdomen). The species live in the sand of the shore. One American species is called the Sand bug, from its habit of burrowing in the sand.

An Orange Pest.

It is reported that a serious attack of a scale insect (*Aspidiotus limonis*) has broken out in the orange orchards of Seville, which at present imperils the very existence of marmalade. This is a newspaper report and the real condition of the orange orchards may not be nearly so unfavourable as the report would indicate. The scale insect reported to be the cause of this injury (*Aspidiotus limonis*) is probably the one that is now known as *Aspidiotus hederae*, the Oleander scale. This insect is reported from many parts of the world and is known to have a great range of food plants, and is therefore not so likely to become a serious pest as one which had been known in a limited locality and with only a few food plants. The great outbreaks of scale insect attacks, as well as other insect attacks, have generally occurred when an insect with a limited geographical range and very few food plants has been transported to a new locality, away from its accustomed environment and the natural enemies that had held it in check.

Lime-tree Bark Borer.

Dead or dying lime trees are frequently found to have a borer under the dead bark, and sometimes several of the same kind are in the stem and larger branches. The most common of these is a slightly flattened, whitish grub with small, brownish head, and a tapering body, the first body segments being much larger than the head and larger also than the succeeding body segments. This is the larva of a long-horned beetle technically known as *Leptostylus praemorsus*, Fab. All the long-horned beetles are borers in the larval condition. They are called long-horned beetles because the adult has very long antennae, always longer than the body and sometimes two or three times as long as the body. The beetles of this family lay the eggs on the bark of trees and woody plants, and the young larvae eat their way through the bark to the cambium and young sap wood beneath.

A long time is required for the growth of the larva, sometimes two or three years. This is followed by a short pupal stage, after which the adult emerges to provide for another generation.

The adult beetle is greyish brown with slender antennae about twice as long as the body which measures about $\frac{7}{16}$ inch in length. On the back there are several small dark spots. When the wing-covers are closed together there is seen an imperfect W formed by the angular dark mark on each wing-cover coming together. Farther back are two irregular light bands edged behind with dark, while the posterior part of the wing-covers is pale brown. The legs are slender except the femora which are swollen.

While some of the long-horned borers attack healthy, living wood, many attack only such trees as are dead or dying, or at least have spots of dead wood or bark where the tree has been injured. The habits of the lime-tree bark borer are not well known, nor are the details of its life-history, but it is likely that the egg is deposited on dead bark or exposed wood, from which the borer may penetrate living wood and increase the injury and hasten the death of the tree.

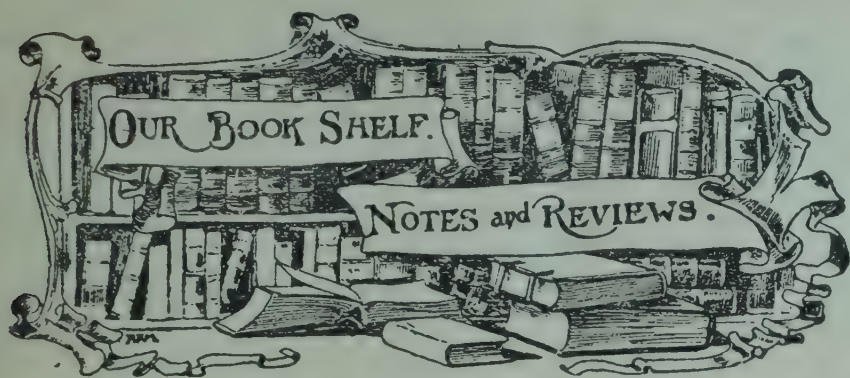
The larval stage occupies more than a year, and the presence of the larva can often be detected by the chips, etc., thrown out through an opening in the bark.

These habits suggest as remedies the careful pruning away of all dead branches, scraping away dead bark from any wound, and covering all exposed wood with tar or other substance for preserving the wood and preventing decay.

If the tunnels of the larva are discovered, they may be probed with a wire to kill the larva, and the bark of the tree may be covered with some material to prevent the laying of the egg or the emergence of the adult. For this purpose the following is recommended: 2 lb. of whale oil soap dissolved in 1 gallon hot water, to which 1 pint of crude carbolic acid is added, and thoroughly stirred in. Add 10 gallons of water and stir in enough clay to make a thick paste. This is smeared or painted on the trunk and when dry makes a hard crust which the adult female cannot penetrate for the purpose of depositing eggs, and which the newly emerged adult will not be able to break through and escape. The girdle paint made of linseed oil, resin and tobacco tea, the recipe for which was given in the *Agricultural News*, (Vol. III, p. 282,) would be a useful substitute for tar, and may perhaps be used for coating the trunks instead of the mixture of whale oil soap, carbolic acid and clay given above.

EXPORTS OF THE CONGO FREE STATE.

Among exports, increases in coffee and rice indicate new progress in agriculture and colonization. Rubber is by far the most important article of export, though its predominance has fallen slightly in the last two or three years, the deficit being compensated for, however, by an increase in the export of other vegetable products. The sales of ivory decreased by 64,353 kilogrammes. Ground nuts are diminishing similarly, the efforts made to develop the cultivation of this product not producing the results expected; it should be added, however, that the exports of ground nuts increased considerably last year, and that, compared with 1901, there was an appreciable increase in the value of the exports. The following are the quantities and values of the principal exports of Congo produce: Ground nuts, 328,463 kg., £2,627; coffee, 136,148 kg., £5,173; rubber, 5,117,983 kg., £1,893,754; palm oil, 1,647,434 kg., £38,879; ivory, 184,954 kg., £151,662; palm nuts, 4,957,635 kg., £59,491; cacao, 89,365 kg., £5,004; rice, 33,654 kg., £673. (*Chamber of Commerce Journal*.)



SISAL HEMP CULTURE IN THE INDIAN TEA DISTRICTS: By H. M. Mann, M.Sc., and James Hunter. Published by the Indian Tea Association, 1904.

It is suggested that a large part of the lands now lying waste throughout the Indian tea districts might be utilized for the growth of sisal hemp. This pamphlet has therefore been prepared to give information as to the equipment required and the commercial prospects of a venture in this direction.

The authors deal at some length with the botany and agricultural requirements of the sisal plant. Full information is given as to planting and the care of the plantation. Dealing with the preparation of the fibre, illustrated descriptions are given of the different fibre-extracting machines in use, from the original Mexican 'Raspador' to the automatic machines, such as Todd's.

After discussing somewhat fully the prospects of a sisal industry, the authors state that it will be a number of years before there is likely to be any such slackening in the annual demand as to lead to serious over-production and a reduction in price below a remunerative figure.

FISHES OF BRITISH GUIANA: By T. Sidney Hargreaves, F.G.S., Demerara: The Argosy Co., Ltd., 1904.

The author states that the intention of these 'Notes' is to try to interest people in the work of the Fisheries Committee, 'so that those who are in a position to supply information will . . . so help on the work of arriving at some definite conception of the value of the fishes of the colony as a food supply, and the extent to which that supply can be increased.'

It is mentioned that a sixty-days' inspection of the market fish stalls showed that thirty-one distinct species had been exposed for sale.

Among the fish on which notes are given are: snook, tarpon, queriman, mullet, flounder, porgy—all peculiar to the coasts, estuaries, and rivers—snapper, grouper, cavally, herring, bashaw, etc., among the deep-sea fish. Interesting notes are given on angling and the habits of different fish.

Dealing with the subject of imported fish, the author states that during the last fifteen years the salt-fish bill of the colony has been \$4,732,917. 'It is encouraging to hear that a venture is on foot to initiate a salt-fish industry, even though on a small scale.'

SCIENCE NOTES.

Shape of Plant Stems.

The following note, in reference to a meeting of the Linnean Society on November 17, 1904, is taken from the *Gardeners' Chronicle*:—

Lord Avebury gave a summary, illustrated by lantern-slides, of a paper entitled 'Note on the Shape of the Stems

of Plants.' It pointed out that while most plants had round stems, in some they were triangular, some quadrangular, etc., but that so far as he knew no attempt had been made to explain these differences. He thought they could, however, be accounted for on mechanical principles.

In building, when the main object was to meet a strain in one direction, the well-known girder was the most economical disposition of material. In a tree-stem it was necessary to resist strains coming from all directions, and the woody tissues acted as a circular series of girders. In herbs with opposite leaves the strains were mainly in two directions, and were met by two opposite girders, thus giving the quadrangular stem.

Taking our native flora, he showed that all herbs with quadrangular stems had opposite leaves, and as a rule herbs with opposite leaves had quadrangular stems. Sedges had triangular stems and grasses round stems, and while sedges had the leaves in threes, those of grasses were distichous. Pentagonal stems might be accounted for in a similar way, and incidentally this threw light on the petals of so many flowers. Thus plants had adopted, millions of years ago, principles of construction which have gradually been worked out by the skill and science of our architects and engineers.

Effect of Scarcity of Plant Food.

The following is a short summary of an article, by Professors H. Wilfarth and G. Wimmer, on the action of the scarcity of nitrogen, phosphoric acid, and potash on plants. The article originally appeared in the *Journal für Landwirtschaft* for 1903:—

A deficiency of nitrogen, phosphoric acid, and potash produces characteristic alterations on the leaves of plants by means of which, especially in sand or water cultures, one can determine without further investigation which constituent is deficient.

With a deficiency of nitrogen the leaves lose their normal sad-green colour and take on a clear-green to yellowish one; finally they dry with a clear, brownish-yellow colour.

When phosphoric acid is deficient the leaves take on a deep, clear-green, almost blue-green, colour. With a greater scarcity there appear on the leaves, first at the margin but later over the whole leaf, dark spots. In the end, the leaf dries with a dark-brown to black-green colour.

The results of a scarcity of potash are specially detailed. Characteristic of this are spots appearing in the neighbourhood of the leaf margin which become distributed over the whole leaf: the stalk, mid-rib, veins, and the parts of the leaf bordering these, however, retain their green colour. Moreover, the leaf curves, with its convex side above. The leaves finally dry up. The symptoms of potash scarcity are specially well studied with beet, tobacco and buckwheat.

Para Rubber in the Malay States. So far as I am able to judge from press reports and from personal interviews with experienced persons, the growing of Para rubber in the Malay States is not only proving successful, but in the very near future is likely to command the world's attention. The growth is continuous and when the trees are cared for, is amazingly rapid, as heat is perpetual and rains frequent. As the Philippine Islands are in the same latitude and have vastly superior soil, I feel that everything should be done to encourage the development of rubber plantations in those islands. (*U. S. Monthly Consular Reports*, August 1904.)



GLEANINGS.

The report of the British Guiana Board of Agriculture for the year 1903-4 has recently been issued. A review of this report will appear in the next issue of the *Agricultural News*.

Mr. Sands reports from St. Vincent: 'It is estimated that there is sufficient seed-cotton picked and sorted to give 100 bales, and as practically all the fields are being picked over, large and increasing supplies are coming forward.'

On December 19, 1904, the new Central Sugar Factory at Gunthorp's, Antigua, was opened in the presence of a large company. The machinery was set in motion by Lady Knollys, and Mrs. Watts fed the mill with the first cane.

At a meeting of the Roseau (Dominica) Town Board on September 27 it was agreed to adopt the proposal to plant palms round Church Savannah on Arbor Day. The Board also expressed its willingness to provide the necessary guards for the protection of the young plants.

We have an inquiry from Liverpool for mangrove bark. The value depends upon the condition of the bark and the strength of the tannin contained in it. The price would be between £2 and £4 per ton. (*Journal of the Jamaica Agricultural Society*.)

At a recent meeting of the Agricultural Society of British Guiana, the President suggested that growers of cocoa-nuts should make copra. 'The value of the sample shown was about £19 10s. per ton, which would give a better return than exporting cocoa-nuts at \$8, \$10, and \$12 per 1,000.'

Dr. W. C. Stubbs has resigned his appointment as Director of the Louisiana Experiment Stations and is to be succeeded by Professor W. R. Dodson, a former professor in the State University and lately Resident Director of the Baton Rouge Experiment Station.

A summary of the results of the experiments with seedling and other varieties of sugar-cane carried on at Barbados in 1903-4, under the direction of the Imperial Department of Agriculture, has been issued as Pamphlet No. 32. It may be obtained of all agents, price 4d., post free, 5d.

Regarding agricultural instruction for teachers in charge of schools in rural districts of England, Dr. Wm. Somerville reports to the Secretary of the Board of Agriculture: 'For him special courses at the Agricultural Colleges are of peculiar importance, and it is satisfactory to note that several of the institutions aided by the Board are taking active part in such work.'

One particular requirement that must be observed in all poultry rearing is the avoidance of inbreeding. New blood every year is quite an important factor. (*Journal of the Jamaica Agricultural Society*.)

Owing to the stock of Paris green held by the merchants of Barbados being exhausted, a notice was published in the daily papers to the effect that Paris green could be obtained from the Agricultural Department out of the emergency stock of the Imperial Department of Agriculture.

It is stated in Schimmel & Co.'s *Semi-annual Report* that a German medical paper recommends, as a protection against gnats, the application on the uncovered parts of the body (hands, neck, and face) of a solution of thymol in 50 per cent. alcohol (2 in 100) by means of a tuft of cotton wool.

Reference is made in the Cape of Good Hope *Agricultural Journal* to the prevalent belief that sulphur administered internally causes ticks to drop off an infested animal. Experiments recently conducted by the Veterinary Surgeon and the Entomologist appeared to show that this remedy has no such effect.

According to the *Agricultural Gazette* of New South Wales there has been a steady increase in the quantity of eggs placed in the Government Cold Stores since the inauguration of the system in 1898. In that year the number of eggs received was 11,000 dozen; in 1903-4 this had increased to 151,128 dozen.

According to the *Consular Report* on the trade of Panama, the agricultural and mineral resources have still to be developed. The forests abound with valuable woods, and there are open savannas with miles of splendid grazing ground. About 300,000 bunches of bananas are exported monthly.

The *Journal of the Society of Arts* for November 11 contains an interesting article on the Barbados banana industry. A short historical account is given, and also a brief description of the procedure adopted. This article will be reproduced in the *West Indian Bulletin* (Vol. V, no. 3).

According to the *Demerara Daily Chronicle*, an important concession has been granted by the Government of British Honduras to an American capitalist for the exploitation of the colony's pine products. The concession was secured primarily for the purpose of making turpentine and exporting the timber. The holder has the privilege of tapping 12,500,000 pine trees.

A scientific experiment station in connexion with the German Colonial Society is to be established in the German colony of New-Württemberg in Southern Brazil, about 250 acres of land having been secured for the purpose. It is hoped that this will help the colonists to secure better returns in the way of crops. (*U. S. Monthly Consular Reports*.)

The United States Department of Agriculture has now two co-operating gardens established especially for the study of the date palm, one at Tempe, Arizona, and one at Mecca, California. In all probability a third garden may be established near Yuma. The thorough studies under way on the life-history of this plant in connexion with its introduction into practical culture promise to yield results of interest both to botanists and to horticulturists. (*Botanical Gazette*.)

WEST INDIAN PRODUCTS IN CANADA.

The following is Mr. J. Russell Murray's monthly report, dated December 9, 1904, on West Indian produce in Canada:—

General Business.—The closing of the year calls usually for some resumé of the year's work, but the following statement of Mr. Clouston, the General Manager of the Bank of Montreal, the largest banking institution in Canada, at the annual meeting held on the 6th. instant, is worthy of reproduction as indicating the spirit of trade:—'Taking a broad view of Canadian commerce, the future is bright with promise. Our population is fed now by an immigration of upwards of 100,000 people annually, and the stream appears to be well turned towards Canada. Production in the North-west grows apace, the railways are prosperous, a second trans-continental line is on the eve of construction; the reports from the mining districts of British Columbia are more encouraging; a spirit of abiding confidence in Canada pervades our people, and despite temporary checks in the progress of material development, there is increasing belief that this country has entered upon an era of great and enduring prosperity.'

Steamship Communication.—The Canadian and West India steamship contract, which terminates six months hence, continues to draw the interest of shipping companies. There are now four companies in the field; representatives from two companies were in Montreal recently on the subject. It is generally recognized that the existing service falls very far short of trade requirements. The entire South American and a large proportion of West Indian business passes through United States ports, and the want of a faster service with good transfer arrangements, through the islands and to Caribbean and South American ports, accounts for much of the trade from and to Canada passing *via* the United States. I again draw the attention of all West India shippers to the value of Montreal as the terminal port during open navigation, as reaching the greatest centres of population and thus saving 836 miles of railway transit besides avoiding double handling of freight. With suitable transfer arrangements, a large amount of South American business could be secured, thereby enabling a larger and faster class of steamers to be employed than could possibly be expected for West India trade alone. During the next few months it is incumbent upon the Chambers of Commerce and Agricultural Boards to draw the attention of their respective Governments to the opportunity now afforded for improving Canadian trade through Canadian ports; and especially in securing to Trinidad an increase of transit trade to and from the Spanish Main that is meantime done direct *via* United States ports.

Sugar.—The market continues strong and active, Europe continuing to be the source of the fluctuations. The month—November 8 to December 8—shows an advance for 88° Beets of 1s. 7½d. per cwt. The local advance for refined sugar is 1s. 3d. per 100 lb. The arrivals of Demerara sugars in Montreal during the month for refining are 29,000 bags, per s.s. 'Vernetta,' via New York. Local quotations are nominal, the only importing business reported being 2,500 tons at 3¼ c. & f. New York for the refiners, and now loading at Demerara. It is estimated that fully three-fourths of the preference goes to the growers in this quotation.

Molasses.—Business is quiet and recent local fluctuations have ceased, and no developments are anticipated until after the opening of the New Year. Prices remain very firm. It is reported that one factory is utilizing molasses for re-boiling for further sugar extraction. Reports to hand to-day show an advance of 2c. to 3c. for molasses in second hands.

Cocoa-nuts.—Prices have remained very steady and demand has been good. New York prices have weakened considerably for all grades. Approaching cold weather will, however, curtail consumption.

Spices.—Pepper continues to maintain the advance. Pimento is very quiet and sales difficult, last sales made by us were at 6c. duty paid, which is better than New York parity. Nutmegs and ginger continue very slow, and prices of both rule low.

Fruit.—Dominica oranges to hand again arrived in bad order, but quality was excellent. A Jamaica shipment to hand ten days ago also arrived with 30 per cent. damage; prices remain very low. Valentia fruit now arriving is a strong factor in competition, and shipments should now be reduced. Prices at \$3.75 per barrel cannot be advanced.

IMPORTS OF TROPICAL PRODUCTS INTO THE UNITED STATES.

The U. S. *Monthly Summary of Commerce* for July, 1904, has tables showing the principal articles of tropical and subtropical production imported into the United States at intervals since 1870, and the growth in consumption of this class of articles.

We extract from these tables particulars as to the importation, during the years 1895 and 1904, of a number of articles that are produced in the West Indies, showing, in a very striking manner, the growth in consumption during the last ten years:—

Article.			1895.	1904.
Cacao	quantity	lb.	29,307,048	72,277,600
	value	\$	3,853,148	9,600,604
Coffee	quantity	lb.	652,208,975	998,831,392
	value	\$	96,130,717	70,000,492
Cotton	quantity	lb.	49,332,022	69,822,701
	value	\$	4,714,375	9,402,932
Fibres	quantity	lb.	477,422,000	599,902,000
	value	\$	10,340,029	34,403,151
India-rubber and gutta percha	quantity	lb.	41,068,401	59,446,644
	value	\$	18,475,382	42,214,219
Sugar and molasses	quantity	lb.	3,168,781,436	4,675,627,813
	value	\$	69,131,658	105,734,475
Tobacco (leaf)	quantity	lb.	26,668,261	33,548,134
	value	\$	16,888,612	21,803,606
Dyewoods and extracts	value	\$	1,853,996	1,522,283
	value	\$	17,239,923	24,990,800
Fruits and nuts	„	\$	2,640,235	4,366,008
Spices	„	\$	495,273	1,424,647
Vanilla beans	„	\$		

The reliance of the United States upon the tropics for large supplies of its foodstuffs and materials for use in manufacturing is again shown by the import figures for the fiscal year 1904, in which the total value of tropical and subtropical products brought into the United States amounted to \$430,556,775, including those brought from the Hawaiian Islands, Porto Rico, and the Philippines. In nearly all of the tropical and subtropical products the importations of the fiscal year 1904 are materially larger than in earlier years, while in quantity the increase is even greater than that in value, because of the declining prices of many of these articles.

MARKET REPORTS.

London,—December 20, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 16; and 'THE PUBLIC LEDGER,' December 17, 1904.

ALOE—Barbados, 15/- to 35/-; Curaçoa, 15/- to 37/6 per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.

BEES'-WAX—£7 to £7 10s. per cwt.

CACAO—Trinidad, 55/- to 59/- per cwt.; Grenada, 52/- to 55/- per cwt.; Dominica, 50/- to 53/- per cwt.; Jamaica, 46/- to 53/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.

COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—No quotations.

GRAPE FRUIT—6/- to 7/- per case.

ORANGES—8/- to 11/- per box of 150-176.

PINE-APPLES—No quotations.

FUSTIC—£3 10s. to £4 per ton.

GINGER—Jamaica, fair bright, 37/-; ordinary to good ordinary, 27/- to 30/- per cwt.

HONEY—Jamaica, 17/- to 22/- per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/8; cake, 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £13 15s. per cask of 108 gallons.

LIME OIL—Distilled, 1/3 per lb.; hand-pressed, 2/6 to 2/9 per lb.

LOGWOOD—£4 2s. 6d. to £5; Roots, £4 to £4 10s. per ton.

MACE—Bold pale, 1/6; red, 1/1 to 1/2; broken, 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.

NUTMEGS—67's, 1/8; 86's, 10d.; 143's, 5d. per lb.

PIMENTO—2½d. per lb.

RUM—Demerara, 10½d. to 1s. per proof gallon; Jamaica, 1s. 10d. per proof gallon.

SARSAPARILLA—7½d. to 1/2 per lb.

SUGAR—Yellow crystals, 21/- to 23/- per cwt.; Muscovado, Barbados, 18/- per cwt.; Molasses, 15/- to 18/- per cwt.

SULPHATE OF AMMONIA—£13 7s. 6d. per ton.

Montreal,—December 9, 1904.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$22.00 to \$24.00 per M.

COFFEE—Jamaica, medium, 9c. to 9¼c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 27c. to 29c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—Jamaica, \$3.60 per barrel; Dominica, \$3.75 per barrel; \$1.75 per box (duty paid).

PIMENTO—Jamaica, 5½c. to 6c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.40 to \$3.54 per 100 lb.

—Muscovados, 89°, \$3.10 to \$3.20 per 100 lb.

—Molasses, 89°, \$2.75 to \$2.85 per 100 lb.

—Barbados, 89°, \$2.85 to \$2.95 per 100 lb.

New York,—December 23, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Dominica, 11c. to 11½c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 13¾c. per lb.

COCOA-NUTS—Trinidads, \$25.00 to \$26.00 per M., selected; Jamaica, \$26.00 to \$28.00 per M.

COFFEE—Fair to good ordinary, 8½c. to 9½c. per lb.

GOAT SKINS—Jamaica, 59c. to 60c. per lb.

GRAPE FRUIT—Jamaica, \$1.50 per barrel.

ORANGES—Jamaica, \$3.00 to \$3.50 per barrel (stem cut).

PIMENTO—4¾c. per lb.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4¾c.; Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 31, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$11.25 per 100 lb.

COCOA-NUTS—\$9.00 per M. for husked nuts.

COFFEE—\$10.00 to \$12.00 per 100 lb.

HAY—90c. to 95c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00.

ONIONS—Madeira (stringed), \$3.00 to \$3.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$2.25 per 160 lb. (retail).

RICE—Ballam, \$4.80 to \$4.85 per bag (190 lb.); Patna, \$3.25 per 100 lb.

British Guiana,—December 29, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$5.50 to \$6.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14c. per lb. (retail).
—Creole, 11c. per lb.

DHAL—\$4.30 to \$4.40 per bag of 168 lb.

EDDOES—\$1.56 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Madeira, \$4.00 per 100 lb.

PEA NUTS—American, 6c. to 6½c. per lb. (retail).

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—\$2.25 to \$2.40 per barrel.

RICE—Ballam, \$4.35 to \$4.40; Creole, \$4.25 per 177 lb., (ex store).

SWEET POTATOS—Barbados, \$1.44 per bag, \$1.68 per barrel.

TANNIAS—\$2.00 to \$2.40 per barrel.

YAMS—White, \$2.16 per bag.

SUGAR—Dark Crystals, \$3.25 to \$3.30; Yellow, \$3.75 to \$4.10; White, \$4.50 to \$5.00; Molasses, \$2.75 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—December 29, 1904.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary \$11.70 to \$11.75; Estates, \$11.85 to \$12.25; Venezuelan, \$12.25 to \$12.75 per fanega (110 lb.).

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—72c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9c. per lb.

COPRA—\$3.15 to \$3.25 per 100 lb.

ONIONS—Stringed Madeira, \$3.50 to \$4.00 per 100 lb. (retail).

MOLASSES—6c. to 16c. per gallon.

POTATOS, ENGLISH—\$1.25 to \$1.30 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; White Table, \$5.50 to \$5.75 per bag.

SUGAR—\$2.75 to \$4.00 per 100 lb.

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on visit to the Cotton-growing districts of U.S.A.



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West Indian Agricultural Conference, 1905.



BRIEF account of the West Indian Agricultural Conference held at Trinidad appears in the *Agricultural News* of to-day. A fuller report including the addresses at the opening and closing of the Conference and at the Conference dinner, together with an abstract of the

proceedings, is published in the 'Conference Number' of the *West Indian Bulletin* also published to-day. The latter conveys in a summarized form a good general idea of the work carried on at the Conference, and we commend it to the attention of our readers. It is obtainable from the London and all agents of the Department. In the meantime, active steps are being taken to publish in the *West Indian Bulletin* (Vol. V, no. 4, and Vol. VI, no. 1,) the numerous and valuable papers read at the Conference and the discussions that followed in as complete a form as possible.

It is hoped by these means to present for the information of those interested a fairly comprehensive review of the efforts that are being made by the Imperial Department of Agriculture, with the aid of the Agricultural Boards and Agricultural Societies and the leading members of the planting community, in improving the agricultural interests of the West Indies.

It is believed that, as the result of the Trinidad Conference, the efforts of the agencies above referred to will enter upon a wider and an increasingly appreciated field of usefulness and that a good many of the hindrances and petty jealousies that have appeared in some quarters in regard to the work of the Imperial Department of Agriculture will now disappear. It is gratifying to observe that, wherever the efforts of the Department have been misunderstood, a fuller knowledge of the objects in view has invariably been followed by the hearty co-operation of those whose interests it was intended to serve. This is particularly true in the case of Local Agricultural Shows, the

establishment of school gardens, and the practical training of the older pupils in elementary schools in garden work.

It is no less true, also, in the case of practical agriculturists whose previous training had led them to regard scientific methods and new ideas with suspicion, but who are now not only convinced of the value of science as a means of increasing the returns from the soil and of successfully treating plant diseases, but take an active share in experiments initiated by the Department with sugar-cane, cacao, cotton, lime, and other crops, and keenly watch the results.

Another aspect of the Trinidad Conference that may be referred to is the growth of appreciation in the value of these gatherings as a means of drawing together in a bond of common interest the various people of these colonies. As mentioned by his Excellency the Governor of Trinidad, an expression of opinion from such a body, whether in suggesting the removal of any disabilities that might exist or in the provision of better systems, would command attention which it would be impossible for any single colony to expect. In proposing a vote of thanks to Sir Daniel Morris for his Presidential Address, the Hon. B. Howell Jones, of British Guiana, spoke of the Imperial Department of Agriculture as an extremely useful—an almost essential—part of the work of organization in connexion with the government of the West Indies. The principle of Imperialism had long existed, he said, in the hearts of our colonists. It was not, however, only an Imperialism of politics that was wanted, but also an Imperialism of Agriculture.

In replying to the toast of 'Success to the Imperial Department of Agriculture,' Sir Daniel Morris spoke of the common object in which the Representatives had come together, viz., the advancement of the whole industrial interests of the West Indies, and trusted that the Conference of 1905 would still further weld together the practical and scientific forces connected with agriculture in these colonies.

The Imperial idea was further given expression to by the Hon. Hugh Clifford (Colonial Secretary) who spoke of a possibility of these Conferences as follows: 'It was my privilege the other day to be present in the Princes' Buildings when his Excellency the Governor made a contribution to the debate on the subject of cane-farming, and while I sat . . . I felt dreamy, and I went away wondering whether, when the future historian comes to write the history of the West Indies, he would say that Sir Daniel Morris . . . had planted

a seed which eventually is to come to great growth in the West India Islands. Whether the Conference that I was looking at, which was attended by members from all the West India Islands, and which represented the best talent and the best agricultural knowledge of all those islands, was perhaps the foreshadowing of a greater Parliament which might possibly represent, and adequately represent, all the interests of these islands in one great federation.'



SUGAR INDUSTRY.

Sugar in Hawaii.

The Hawaiian Sugar Planters' Association has recently published a number of reports from its special committees which are appointed annually to investigate matters relating to the condition of the sugar industry. The following brief summary of these reports is likely to be of interest to sugar planters:—

The Committee on Fertilization addressed a circular letter to each manager in the islands with the object of attaining as complete data on the subject of manures as possible. The opinions expressed naturally varied considerably, and the plan has been adopted by the Committee of tabulating the replies under the various headings. The value of a larger amount of potash than has been usual is insisted on in many of these replies. Nearly all the plantations use a mixed chemical fertilizer containing nitrogen, potash, and phosphates. Nitrate of soda is also usually applied separately. Green manuring with leguminous crops is not practised on most estates with much success. The amount of humus present in the soil would appear on many estates to be very low, largely, no doubt, owing to the usual practice of burning all trash.

The report of the Committee on Utilization of By-products deals mainly with the use of waste molasses. This is strongly recommended as a feed for mules and stock. Experiments and figures are given which support this recommendation. The next most economical way of using waste molasses is said to be to burn it in the furnaces. This committee also reports that enough attention is not given on most plantations to the proper preservation and curing of stable manure and its application to soils sadly in need of organic matter or humus. It is also said that in some soils the chemical fertilizer is practically inert or lost owing to the poor physical condition of the soil on account of the lack of humus. The burning of trash is said to be necessary in order to destroy boring insects.

The report of the Committee on Handling and Transportation of cane states that each district has about settled to its satisfaction the system or combination of systems best suited to its needs. Of the thirty-two plantations that replied, eighteen use railroads, seven flumes, and seven use combinations of systems—flumes, railroads, trolleys, traction engines, wagons. Two loading machines are described, namely, the 'Wilson-Webster' and the 'Gregg.' Both these machines are favourably reported on and reduce

the cost of loading; the Wilson-Webster seems to be rather the better. The machine, however, has yet to be invented which will pick the cane from the field and place it on cars.

The report of the Committee on Manufacture is stated to have for its object to discover the true standing of the art of making sugar in the Hawaiian Islands. The processes of milling and extraction have been taken up by the Committee on Machinery. The present report deals with such subjects as extraction, clarification, evaporation, sugar house control, etc.

The Committee on Labour-saving Devices also deals in this report with cane-loading machines. Importance is attached to a new invention, used in Louisiana. No cane-cutting machine which is altogether satisfactory is described, though efforts have been made to induce machinery manufacturers to take the matter up. New ploughs and other cultivators are also shortly mentioned.

Martinique.

The following extracts from the *Consular Report* on Martinique for 1903 deal with the position of the sugar industry in that island:—

The exports of sugar from Martinique in 1903 show a decrease of 5,906 tons in quantity and of £61,679 in value as compared with the shipments during the preceding year.

The decrease in the quantity of sugar manufactured is due to a variety of causes, the chief being the low price of sugar. Among other causes may be mentioned the temporary suspension of cultivation on the plantations in the north of the island in consequence of the volcanic eruptions of 1902, the destruction of one of the sugar factories at that time, and lastly, the reluctance of the planters to extend cultivation until the benefits of the Sugar Convention are felt here.

The crop of 1903-4 promises to be still smaller owing to the damage done to the young cane plants by the cyclone of August 1903, a loss of 25 per cent. being anticipated from this cause.

Instead of the bounty of 13 fr. 50 c. per 100 kilos. hitherto allowed him, the Martinique planter will now receive only 2 fr. 25c. per 100 kilos. 'détaxe de distance,' and about 1 fr. 15c. per 100 kilos. 'boni de tare.'

This 'détaxe de distance' is claimed by the French colonial planter to be inadequate, the sum actually paid for freight and other charges to place his sugar on the French market amounting, it is stated, to fully 4 fr. 55c. per 100 kilos.

Under the circumstances, the outlook for the sugar factories is far from bright. Two only of the factories worked by companies paid a dividend during the current year, and two factories, it is reported, are to close after the crop of 1903-4.

In 1903, 53,982 gallons less rum were exported than in the previous year. Better prices, however, prevailing, £26,518 more were realized than in 1902.

STOCK NOTES.

A Good Milch Cow.

The following notes on milch cows are taken from the *Agricultural World* of December 31, 1904:—

A good milker shows it in her general appearance. She should be clean, clear fleshed, and with nostrils which do not show fast breathing; keen eyes, but with no symptom of

a wild look; well-shaped, pointed ears; thin, rather long neck; straight, even back, which does not sink in the middle, nor rise or fall at top of tail; clean, well-shaped legs; udder dark yellow, with evenly formed teats; six teats are rather a recommendation, but more than four should never be brought into use. It is a good practice to handle and speak to the cow when tending her, so that when she is to be milked she will become quite docile.

The power of the cow to take and digest large quantities of food regulates to a considerable degree her value as a milker. The small eater is of little value, as it is impossible for her to make milk out of food that contains too little of the elements for force or milk making.

In all cases a large eater is wanted. The large eater will have a depth of body not seen in the small eaters. The breadth of the body will also be more than that of cows that are small producers of milk. In the same connexion we may say that the body must also be long. It is not enough that the cow have a deep and wide paunch if it is short. With these go the strong jaws, which must be strong to masticate the amount of food the animals require to fill the large cavity of the stomach. The greatest number of good feeders have marked depth of body, and the ribs are what we call well sprung. This means that the ribs are not bent down in such a way as to decrease the size of the abdominal cavity. No matter what the temperament of the cow may be, if she has not the power to digest easily a great quantity of food, she will be of little use as a milk producer.

Small Settlers' Cows.

Mr. Wm. Cradwick, Travelling Instructor, writes as follows in the December issue of the *Journal of the Jamaica Agricultural Society* on the subject of suitable cows for small settlers. This is a subject to which special attention should be paid. One of the principal duties of the Travelling Instructors in Jamaica is the encouragement of stock-keeping, even in a very small way, among peasant proprietors:—

Small settlers should endeavour to select their heifers for breeding on the following points:—

(1) Tameness; (2) healthiness; (3) size, especially length and breadth and depth as opposed to legginess; (4) large yield of milk.

The bull should be on the same lines. Never use a bull whose only recommendation is cheapness: take a little trouble if necessary, and if necessary also spend an extra pound for a good bull.

See that he is also: (1) tame; (2) healthy; (3) of a good build, short on the legs, long and low. Try to find out if his mother is still alive, and if so, if she breeds regularly, raises her calves well, and gives plenty of good milk. If she does that her son is a good bull to breed with.

It is a mistake to suppose that a cow cannot give a good quantity of good milk, and yet keep in good condition, give good lusty calves, and weigh well herself when fat.

I have seen at Mr. Young's a cow give 10 quarts and a pint before the calf sucked at all, and that cow moderately fat would weigh 550 to 600 lb. I know a small settler who has a cow which gives 7 quarts in the morning and raises fine calves, is always in good condition herself, and would if fat weigh a good 600 lb. Chance? Yes, perhaps so! but careful selection comes to the same thing. A strain of milch cows is not made in a day or a year, but in many years. We have the basis of a good strain, but if careful selection is not carried on we shall never get beyond that basis.



WEST INDIAN FRUIT.

PORTO RICO PINE-APPLES.

Mr. J. Jones, Curator of the Botanic Station, Dominica, writes as follows in reference to three varieties of pine-apples received from the Porto Rico Agricultural Experiment Station in August 1903:—

A few plants of each variety have now fruited and I am able to place them as follows:—

Cabezona.—This is the well-known Bull Head of these islands.

Pan de Azucar.—This is the Black Antigua pine-apple.

Caraquena.—A form of pine-apple known here as the White Dominica. It is inferior to our local variety.

SECOND SHOW OF COLONIAL FRUIT.

For the information of fruit growers in the West Indies we have pleasure in reproducing the following paragraph from the *West India Committee Circular*:—

The Council of the Royal Horticultural Society have decided to hold a second Show of Colonial Fruits on Thursday and Friday, March 30 and 31 next, with a view to the exhibition of such fruits as could not be looked for in perfection on December 13 and 14 last. As the first Show was so successful, many of the colonies which did not avail themselves of it will doubtless be glad of this opportunity of displaying their produce, and the West India Committee will be very glad to make the necessary arrangements for such colonies as may decide to exhibit. The fruit will have to be despatched by the mail leaving Barbados on March 11, and arriving at Southampton on March 23, and should be consigned to the Secretary, The West India Committee, at the Royal Horticultural Hall, Vincent Square, Westminster.

In a letter to the Imperial Commissioner of Agriculture, the Secretary of the West India Committee makes the suggestion that in all the West India Islands permanent exhibition committees should be appointed, with a view to securing adequate representation at all exhibitions in Great Britain.

LECTURE ON WEST INDIAN FRUIT.

At the General Meeting of the Royal Horticultural Society, held on December 13, in connexion with the show of Colonial-grown Fruit, Mr. W. G. Freeman, B.Sc., F.L.S., Superintendent of the Colonial Economic Collections at the Imperial Institute, and formerly Scientific Assistant to the Imperial Department of Agriculture, gave a lecture on 'The Fruits of the West Indies.' The lecture was illustrated by means of

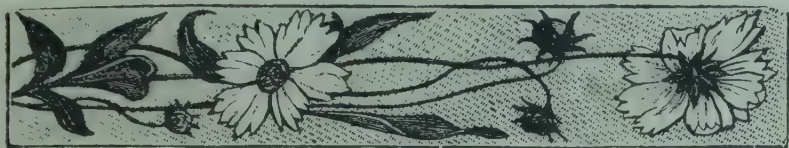
specimens of the more important fruits, whilst a fine series of water-colour drawings of Jamaica fruits, from the collections of the Imperial Institute, was exhibited.

We extract the following from a report of the lecture published in the *West India Committee Circular* of December 20, 1904:—

The measures necessary to improve the West Indian fruit trade were next discussed, and the work being carried on in the West Indies in disseminating information, and above all in practically demonstrating the best methods of grading, handling and packing fruit, dwelt upon. As an instance of the thoroughly practical nature of the efforts made to improve the quality of the fruits cultivated, the system of Botanic Stations under the control of the Imperial Department of Agriculture was described. It was shown how, to take one instance, the Dominica Botanic Station, during a single year, distributed to planters in the island over 57,000 plants, including large numbers of budded oranges and other high-class fruit trees. Similar work was being carried on in other islands. In Jamaica experiments were in progress to improve the pine-apple, and some 2,000 seedlings were now under cultivation. By means of budding and grafting, the stock of mangos was being bettered, whilst it had recently been ascertained that the avocado pear could be successfully budded, and attention was now being directed to the production of a variety better adapted to transport.

The history of the production of spineless limes in Dominica was given, and it was shown that in addition to being spineless the plant yielded fruits of very high quality as regards citric acid content. Plants of the spineless variety were now being distributed from the Botanic Station, the demand being greater than the supply. Trinidad had contributed its share to recent progress, in the form of a seedless lime, which was being perpetuated by budding. In addition, new fruits or improved varieties of fruit already cultivated were continually being introduced, many through the Royal Botanic Gardens, Kew, which had done, and continued to do, so much to disseminate valuable plants throughout the Empire.

The fruit industry of the West Indies depended for its continued progress and success on the cultivation of good varieties of fruit plants, on the careful picking, grading, and packing of the produce. The agricultural workers in the West Indies were devoting earnest attention to securing the ideals, and in spite of many disappointments had achieved a tangible measure of success. These efforts, however, would not suffice unless they were supplemented by proper shipping facilities, that is to say, the regular calls at frequent intervals of vessels properly fitted for fruit transport.



COTTON INDUSTRY.

Sea Island Cotton Seed.

The following is an extract from a letter from Mr. Carter Rey, of Anguilla, to Dr. Watts on the subject of the Sea Island cotton seed imported by the Imperial Department of Agriculture:—

With reference to what has been said about the Rivers' seed being mixed, it might interest you to hear that now my cotton is in full bloom I have not been able to discover a single mixed variety in the fields planted with Rivers' seed. It is also notable all over the island that this cotton is more vigorous than the local variety, and where it has been properly planted with ample room, the bolling is much heavier.

Profits of Cotton Growing in Barbados.

The following is an abstract of a statement of expenditure and receipts in connexion with the cultivation of cotton upon 22 acres on an estate in Barbados:—

The land was planted in cotton and corn. The expenditure on planting and cultivating the two crops, including digging cane holes, weeding, supplying, etc., was \$65.74; the cost of reaping the corn (254 bushels) picking, ginning and baling the cotton was \$456.20, making a total of \$521.94.

The receipts were: sale of 6,925 lb. of lint, netting \$1,957.21; estimated sale of 162 lb., at 1s. 4d. per lb., \$45.36; value of seed crushed, \$266.07; value of corn, \$203.20, bringing the total receipts to \$2,471.

The profits from the 22 acres were therefore \$1,949.90.

Sea Island Cotton Market.

The following is extracted from the latest report, dated January 7, 1905, received from Messrs. H. W. Frost & Co., of Charleston and Savannah, in regard to the state of the Sea Island cotton market in the United States:—

There has been a moderate demand for odd bags, classing fully fine at 24c. to 25c.; extra fine at 27c. resulting in the above sales. Some small crop lots were also disposed of, and the Robt. Bee crop was sold for France at 31c.

Factors are generally refusing to sell under a basis of fully fine at 25c., and some smaller lots are held higher.

The Planters Crop lots are seeking sale, and with orders in hand we can buy at some concessions.

We quote: Fine to fully fine, 24c. to 25c.; fully fine to extra fine, 26c. to 27c.; extra fine crop lots, 28c. to 30c.; extra-extra fine crop lots, 40c. to 55c.

In their report for December 31, 1904, Messrs. Frost state in regard to the present Sea Island crop:—

The Ginner's Report, issued by the United States Bureau to-day makes the quantity ginned to December 13 to be 85,728 bales. This was larger than was expected by the trade generally and will cause crop estimates to be increased to 95,000 bales.

West Indies.

A sixty-page supplement to the *Manchester Guardian* of December 31, 1904, which contains a review of the year's trade, agriculture, and finance, devotes about two-thirds of its space to the cotton industry. Dealing with the subject of cotton cultivation in the Empire, the following reference is made to the West Indies:—

It is almost an irony of fate that England should again turn for cotton to the West Indies, once her principal source of supply. It is not generally known that in the early years of the nineteenth century we obtained 40,000 bales, or about half our total requirements, from our West Indian possessions. It was not until 1802 that our imports from the United States for the first time exceeded those from the West Indies. In 1902 our total imports of cotton from our old sources of supply had dwindled down to less than 1,000 bales.

Luckily the West Indian Department of Agriculture was under the supervision of a practical agriculturist with a scientific training. Sir Daniel Morris, with his assistant, Dr. Francis Watts, took up the cause of cotton growing with the greatest zeal, and the efforts of these two gentlemen were largely assisted by the enthusiasm of Sir Gerald Strickland, the Governor of the Leeward Islands.

Sir Daniel Morris paid a special visit to the United States to study the conditions of cotton cultivation in Florida, Georgia, and South Carolina. This was followed by the publication of two most useful pamphlets—'Sea Island Cotton in the United States and the West Indies' and 'A.B.C. of Cotton Cultivation.' Lectures were given in various islands with instructions to the planters what to do and when to do it. There is no doubt that cotton growing would to-day be in a very much more advanced stage in other parts of the British Empire if we had a few more officials of the stamp of Sir Daniel Morris and Dr. Francis Watts. In no other part of the Empire has cotton growing advanced so rapidly or so nearly approached a commercial basis. Acting on Sir Daniel Morris' advice, the Council [of the British Cotton-growing Association] decided to send out a representative to complete all the necessary arrangements for buying, financing, and ginning. Mr. Lomas Oliver, a member of the Council and an expert spinner of the very finest counts of cotton, very kindly placed his services at the disposal of the Council, and went out to the West Indies last October. One of the principal objects of his visit was to point out to the planters the quality of cotton they should aim at producing, and to draw attention to faults in last year's crop with a view to their elimination in the future.

By this means the planter and the spinner will be brought into the closest touch, the planter will be able to obtain the best possible price, and the Association will have established a sound business which will in future years be remunerative to themselves and of advantage to both producer and consumer. Fortunately it has been proved beyond all possible doubt that the West India Islands can grow Sea Island cotton of the best quality, and that the planter can make money out of it. There are some who think that cotton may in some islands take the place of sugar. If it does come to a question of competition, the conditions are so much more favourable in the West Indies that the planters there can produce Sea Island cotton more economically than can be done in the United States.

This is a marvellous result to have obtained in so short a time, and if the Association had attained no other result than this, they would have fully justified its existence.

WEST INDIAN AGRICULTURAL CONFERENCE, 1905.

As stated in our last issue, the fifth West Indian Agricultural Conference was formally opened on January 4, when a hearty welcome was extended to the Representatives by his Excellency the Governor (Sir Henry M. Jackson, K.C.M.G.), and the President of the Conference delivered his opening address.

In the proceedings of the Conference a prominent position was assigned to the sugar-cane industry, the first subject on the agenda being the 'Results of recent experiments with Seedling Canes and Manurial Experiments in the West Indies.' A valuable paper on the sugar-cane experiments in British Guiana, which had been prepared by Professor J. B. Harrison, was read by Mr. E. W. F. English. It was stated that 14,000 acres were occupied in British Guiana with varieties other than the Bourbon; of these about 12,000 acres were being cultivated in new seedling varieties, the favourites being D. 109, B. 147, D. 145, D. 625, and B. 208. In late years nearly one-third of a million tiny canes had been raised, from which a few showed promise of being of actual value agriculturally. Professor J. P. d'Albuquerque then presented some of the results of the experimental work in Barbados. These have already been published in Pamphlet No. 32, *Seedling and other Canes at Barbados, 1904*. He was followed by Dr. Watts, who dealt with the experiments in the Leeward Islands, a full report on which is already in the press and will shortly be issued. An interesting paper showing the favourable results that had been obtained with the White Transparent and D. 95 on the large area of 1,762 acres on a group of estates in Trinidad was presented by Dr. Ulrich. D. 95 had given an average return of 23.65 tons per acre as against an average of 21.23 tons for the White Transparent, and 16.43 tons per acre for the Bourbon.

The next subject brought up for discussion was the Cane-farming Industry. The discussion was opened by the Hon. B. Howell Jones (British Guiana) and Professor P. Carmody (Trinidad). An interesting discussion followed the reading of these papers in which his Excellency the Governor, the Hon. S. Henderson and others took part. Sir Henry Jackson described the very successful system of 'company' cane farming in vogue in Fiji. Other papers that were presented to the Conference in connexion with the sugar industry included reviews of the principal insect and fungoid pests of the sugar-cane, the field treatment of cane 'tops' for planting, and the polarimetric determination of sucrose.

Trinidad being the foremost cacao-producing colony in the West Indies, considerable interest attached to the discussion of important subjects relating to that industry. Mr. Hart read a short paper dealing with experiments that were being carried on with the view of improving the health and productiveness of cacao trees. This was followed by a short paper, prepared by Mr. J. G. de Gannes, one of the leading cacao planters in Trinidad. The discussion which followed was taken part in by a large number of the Representatives, and some valuable information was elicited. Among the points raised, and which received considerable attention, was that of shade for the cacao trees. It was apparent from the discussion that widely divergent views were held in this connexion in the various islands: in Trinidad it was considered that shade trees were indispensable; in Grenada cacao trees did not appear to require shade, while in other islands cacao was grown both with and without shade. It was suggested by the President that an extensive series of experiments might be carried out in

Trinidad by the Agricultural Society with a view to obtaining definite information on this point.

The attention of the Conference was next turned to the Fruit Industry. Mr. J. R. Bovell (Barbados) read a short paper upon the efforts to establish a fruit industry in Barbados, with special reference to bananas.

The subject of the recently established cotton industry was next brought forward. Brief statements were made by Mr. J. R. Bovell (Barbados), Dr. Watts (Leeward Islands), and Mr. W. N. Sands (St. Vincent).

Under the heading of 'General Subjects' several interesting papers were read by Representatives. These included 'Agricultural Banks' by the Hon. Wm. Fawcett (Jamaica), 'Experiments in establishing Rubber Plantations, 'Anthrax,' and others.

Attention was also devoted to matters connected with agricultural education. The results of the efforts that have been made to introduce the teaching of the principles of agricultural science into Colleges and Secondary Schools were reviewed by Mr. Horace Deighton and Professor d'Albuquerque (Barbados) and Professor Carmody (Trinidad). Mr. J. H. Collens, Inspector of Schools, read a paper on 'School Gardens and School Shows in Trinidad,' while Mr. J. R. Williams dealt with 'Popular Agricultural Education in Jamaica.'

Through the kindness of the Trinidad Agricultural Society several interesting excursions were organized. The first of these was a visit to the Usine St. Madeleine on Saturday, January 7, the Representatives being shown over the factory by Mr. Peter Abel. After leaving the Usine the Representatives were taken to Princes' Town for lunch. On Tuesday, January 10, they left Port-of-Spain at 9 a.m. by special steamer for La Brea to see the celebrated Pitch Lake. On Thursday, January 12, a visit was paid to the Caroni estate where the Naudet diffusion-process plant was in course of being installed. An opportunity was also given of seeing the steam ploughs at work on this estate. The Representatives then proceeded to La Horqueta estate, the property of Messrs. Borde Bros., and inspected the cacao cultivation. Further opportunities of seeing cacao cultivations were obtained at Sangre Grande.

Other excursions were arranged as follows:—On January 4 a visit was made by the Representatives to the Botanic Gardens, and on the following day to the St. Clair Experiment Station when Mr. J. H. Hart, the Superintendent, kindly pointed out the objects of interest.

On Monday, January 9, an afternoon visit was paid to Mr. Hoadley's cacao estate at Chaguanas to inspect a new steam-drying plant for cacao, and also a factory for preparing concentrated lime juice and distilled oil.

The Annual Sale of Stock at the Government Farm taking place on Wednesday, January 11, a number of the Representatives took the opportunity of attending.

The Representatives were thus enabled to obtain a good idea of methods of cultivation adopted by Trinidad planters.

On Friday, January 13, the proceedings terminated. A vote of thanks was passed to his Excellency the President and Members of the Trinidad Agricultural Society for the assistance that had been rendered in connexion with the Conference. A vote of thanks was also proposed to the President for the manner in which he had conducted the business of the Conference. In replying to this vote, Sir Daniel Morris thanked the members of the Conference for the cordial manner in which they had co-operated with him and expressed the hope that great good would accrue from the Conference, not only to Trinidad but also to the whole of the West Indies.

BARBADOS BANANA INDUSTRY.

The following is an extract from a report presented by a Committee of the Barbados Agricultural Society at a meeting of the Society on December 30, 1904, in reference to the shipment of bananas:—

The Committee, after carefully considering all the information supplied by Sir Daniel Morris, Captain Owen, of the Royal Mail Steam Packet Co., Messrs. H. E. Thorne, J. R. Bovell, and other members of the Committee who are shipping bananas, are of the opinion that for nine months of the year, with thorough ventilation on board the R.M.S.P. Co's. ships, the fruit can be carried in good condition. In support of this, they may mention that from the beginning of January to June 4 the bananas shipped by the Department of Agriculture arrived in England in excellent condition; only 32 bunches, out of a total of 2,690 shipped, arrived in England rotten, and the average price paid to the planters for that period for single bunches was 3s. 10⁴/_{d.}, and for bunches sent in double crates 3s. 4⁷/_{d.} per bunch. During the summer months, however, it is found that the fruit has in many instances arrived in England in a very unsatisfactory condition; not only was a certain number of bunches rotten, but a very large proportion of the others was over-ripe, necessitating a forced sale.

Standing out conspicuously during the summer months, was the shipment made by the S.S. 'Tagus' on July 30, in the hold in which Hall's cold-storage system is installed, and in which the fruit was carried. This shipment arrived in England in excellent condition, there being not a single bunch bad out of the whole consignment. Messrs. W. Pink & Sons, to whom they were sent, reported that it was one of the best consignments they had ever received, and the bananas netted to the planters 3s. 8¹/₂^{d.} for single bunches and for bunches in double crates 2s. 10^{d.} per bunch. In spite, however, of this shipment arriving in good condition, and so keeping up the average, the bananas from June 18, to the end of August only netted for single bunches 2s. 2⁴/_{d.}, and for doubles 1s. 10³/_{d.} per bunch. From the beginning of September to the end of October the average net price per bunch was 1s. for singles, and 1s. 7¹/_{d.} per bunch for doubles. Thus it will be seen that, from the beginning of September to the end of October, the amount received for the bananas hardly paid for the crates and the cost of packing. From information, however, recently received the bananas are again arriving in England in good condition.

Although the loss on recent shipments has, no doubt, been very disappointing, for those who only commenced to ship when the hot weather began, it may be stated that the average net amount paid to the shippers from the beginning of January to the end of October is 2s. 6⁹/_{d.} for single bunches, and for bunches sent in double crates 2s. 3⁹/_{d.} per bunch. Assuming that the cost of the crate, packing, and delivery in Bridgetown is on the average 1s. 6^{d.} for single bunches, and 1s. 3^{d.} per bunch for bunches in double crates, the net amount to the planter would be 1s. 0⁹/_{d.} for singles, and 1s. 0⁹/_{d.} per bunch for doubles.

Whether the ventilation on board the ships during the hot months has been sufficient is, your Committee believe, doubtful. They have, however, been informed by Sir Daniel Morris that when he was in England he inspected the fruit holds of the 'Orinoco' and 'LaPlata,' and arranged with the Royal Mail Steam Packet Co. to make better provision for carrying the fruit, and this, your Committee are informed by

the Sub-Committee, is now in course of being carried out, but that the arrangements are not yet quite satisfactory.

The question whether during the hot months, when the wind is blowing from the same direction in which the vessel is going, and the ship, so to speak, enveloped in a cloud of hot air, the ordinary ventilation will suffice, is, the Committee think, very doubtful. The question therefore arises whether it is desirable to pay an extra rate during the hot months, and get the fruit carried in the Hall's cold-storage holds instead of the ordinary ventilated holds, or whether shippers would be prepared to run the risk of a certain proportion of their fruit arriving in England during the hot months in bad condition. Another solution of the difficulty, if it could be arranged, would be for the bananas to be planted so as to cause the principal supply of fruit to come into bearing during the cool season, i.e., say, from the beginning of November to the end of May.

The Committee would, however, point out that in their opinion, it would be very detrimental to the interests of the banana industry, if there was an entire cessation of shipments during any month of the year.

The Committee would recommend that the Royal Mail Company be approached, in order that the fruit chambers on board the S.S. 'Tagus' and 'Trent' may be available for Barbados fruit at the present rates of freight until suitable accommodation be provided elsewhere.

BEE KEEPING.

Output of Honey from the United States.

As showing the immense proportions of the bee-keeping industry in the United States, the following note is taken from *Gleanings in Bee Culture* for December 15, 1904:—

It is perhaps well that the bee keepers of the country should know something of the immensity of the bee-keeping industry, including not only the production of honey itself, but the manufacture of supplies for the same. Some time ago I made an estimate, based on the exact knowledge of the number of sections that are made annually, that the amount of honey produced, both comb and extracted, would make a total aggregate of from 100 to 125 millions of pounds, worth from 8 to 10 millions of dollars. Very recently the editor of one of our bee papers figured out from some Government statistics that had then just been issued that 6,667 car-loads of honey were annually produced in the United States. It is a little significant that my own figures, arrived at from an entirely different source, and in a different manner, should show that, on a conservative estimate, there were 7,000 car-loads produced, or almost the same as represented by the Government statistics. But it is reasonably certain that the above estimates are, at the present time, away below the actual mark, and that we should be safe in figuring on a total output of 10,000 car-loads. If we estimate 40 feet between the bumpers of the cars, this would make one continuous train 75³/₄ miles long; but for fear the average public would not believe these figures we have put the estimate at the very conservative figure of 50 miles. The mere fact that apiculture is making rapid strides in foreign countries—even more rapid than it is in the United States—goes to show that the little bee, in spite of its insignificant size, is making its influence felt in the world. It thrives in every climate except where there are arctic snows to cut off all sources of nectar.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 31 of this issue.

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with certain general aspects of the West Indian Agricultural Conference of 1905. A brief summary of the proceedings of the Conference is given on p. 22.

In connexion with the sugar industry a note is published in reference to the position of the industry in the island of Martinique, also a summary of recent reports of special Committees of the Hawaiian Sugar Planters' Association relative to cultivation and manufacture (p. 18-9).

A summary of an interesting lecture by Mr. W. G. Freeman on West Indian fruits is published on p. 20; also an announcement relating to a second show of colonial fruit to be held in London.

Notes in regard to the cotton industry (p. 21) deal with the Sea Island cotton market and Sea Island cotton seed in the West Indies; extracts are also published from an account in the *Manchester Guardian* of the great progress already made by this industry in the West Indies.

A valuable report on the shipment of bananas from Barbados on p. 23 will be read with interest.

The 'Insect Notes' in the present issue refer to the identification of the new sugar-cane pest of British Guiana, while an interesting experience with a stinging caterpillar in Trinidad is related.

Mr. J. R. Jackson's monthly report on the London spice and drug market will be found on p. 29.

Cotton Seed for 1905.

In connexion with cotton planting during the coming season it is announced that the Imperial Department of Agriculture has made arrangements to procure a further supply of selected Rivers' Sea Island cotton seed to be delivered early this year. Those who desire a supply of this seed, which will be charged at *cost price*, are desired to communicate, without delay, with the officers of the Agricultural Departments in the colonies in which they reside.

West Indian Agricultural Conference, 1905.

A special conference number of the *West Indian Bulletin* has been issued and is being distributed by this mail. It contains a full report of the opening of the Conference, with the President's address, of the proceedings at the Conference dinner, and an abstract of the general proceedings of the Conference.

The full text of the papers read by the Representatives, together with a summary of the discussion following each paper, will be published in the *West Indian Bulletin*, Vol. V, no. 4, and Vol. VI, no. 1, as soon as possible.

Elsewhere in this issue will be found a brief account of the proceedings of the Conference and of the excursions to sugar and cacao estates and other places of interest which were organized in connexion with the Conference.

Development of British Honduras.

In a recent report on the colony of British Honduras Mr. Dale discusses at some length the general principles which should govern the measures to be undertaken for developing the resources of the colony.

The mineral resources are practically an unknown quantity and must be left out of account: the colony's prosperity must be sought in its forests and its agricultural resources. Of the latter it is sufficient to say that for practical purposes they are inexhaustible, if properly worked. The soil of one part of the colony or another is capable of growing almost any kind of tropical produce. There are found at present vanilla, the cohune palm, rubber, cassava, tobacco, sugar-cane, cotton, and ginger, some of them growing wild in the forest, some under cultivation at the Botanic Station or elsewhere.

At present the prosperity of the colony depends upon logwood and mahogany. All its finance rests upon this one industry. When these woods fetch a good price, all goes well: when prices are low, trade and revenue alike fall. The timber trade, moreover, becomes more difficult and less remunerative every year, on account of the increasing difficulty of getting the wood down to the coast as the forests near the rivers are cut out.

The main efforts of the Government should therefore be devoted to the encouragement of other industries. With the exception of bananas no such industries have at present reached any considerable development.

Experiments with Rice in British Guiana.

The recently issued 'Report on the Agricultural Work' in British Guiana contains an account of interesting experiments with varieties of rice.

Several carefully selected varieties of rice were imported from Ceylon with which the experiments were carried out on an area of about 3 acres. Certain of these varieties show promise of being of high value for cultivation in the drier districts of the colony.

A further experiment was commenced in March 1904. The varieties grew with much vigour, the imported varieties maturing in four months, while the 'Creole' took five. In the majority of the cases the proportion of straw to paddy was excessively high; further experiments are to be undertaken to discover an explanation of this. The yields of paddy per acre obtained from most of the imported varieties were from 20 to 30 cwt.; from the 'Creole' 14.6 cwt.

Barbados Banana Industry.

We publish on p. 23 an important report by a Committee of the Barbados Agricultural Society in reference to the shipment of bananas. The present position of the industry is briefly as follows:—

Till July of last year everything had gone well, and growers had obtained good prices for their fruit. But from that time, owing to the warmer weather encountered by the steamers and also the exceptionally large crop of English fruit available during the summer months, many of the bananas arrived in poor condition and low prices were obtained, which scarcely paid for the crates and cost of packing.

The point has been established that if the bananas are carefully selected and well packed, and shipped in cold-storage chambers, there is little risk about their arrival in good condition. So far, only the 'Tagus' and the 'Trent' are fitted with Hall's system of cold storage, and it is suggested that the fruit should be shipped by these steamers.

Another suggestion is that bananas should, as far as possible, be so planted as to cause the principal supply of fruit to come in during the cool season (November to May). But it is not thought desirable that there should be any entire cessation of shipments.

The Committee report that the fruit is now again arriving in England in good condition.

It may be mentioned that from January to October 31, 1904, 8,012 single bunches of bananas were shipped and 3,656 bunches in double crates.

Local Exhibition at Barbados.

The annual Local Agricultural Exhibition for Peasant Proprietors took place under the auspices of the Imperial Department of Agriculture, and by permission of the Hon. Forster Alleyne, at Dunscombe plantation, St. Thomas, on Tuesday, January 24. In spite of the showery weather the attendance was above the average.

The exhibits were of particularly good quality, especially in the classes for fruit, vegetables, and small stock. In some of the sections, however, the exhibits

were rather fewer, but still showing greater care and attention in their production. The Elementary School children's exhibits were very numerous and showed a distinct improvement on former years. In this section special interest attached to the exhibits of inarched and budded mangos and avocado pears, for which a Diploma of Merit was given to the master and children of Good Intent School.

The following additional Diplomas of Merit were awarded: Blowers estate, for yams, sweet potatoes, and guinea corn; Dunscombe estate, for stool of B. 208 canes and crate of bananas packed for shipment; Whim estate, for un-ginned Sea Island cotton; Grazettes estate, for ginned Sea Island cotton.

Great interest was taken in the keen competition for the prizes offered by Mrs. Dickson and another lady for the best-kept working donkey. These were offered with the view of enlisting a wider sympathy with these hard-working little animals.

His Excellency the Governor, in distributing the prizes, expressed the pleasure it had given him to attend the Show and congratulated Sir Daniel Morris and his co-workers on the success of the exhibition.

Sir Daniel Morris said that he was very pleased with the fifth Local Exhibition; the articles were better than on previous occasions and the attendance was much larger. He noticed a general improvement in the quality of all the produce shown.

Royal Horticultural Society's Fruit Exhibition.

A brief notice appeared in the *Agricultural News* (Vol. III, p. 404) with reference to the list of awards secured by the West Indies at the Royal Horticultural Society's Exhibition of Colonial-grown Fruit, held on December 14 and 15, 1904. From the papers received by last mail we learn fuller particulars with regard to the West Indian exhibits which may be of interest to our readers. A catalogue of the exhibits has also been issued by the West India Committee.

The West Indian Section was organized by the West India Committee and included official exhibits from Barbados and Dominica. The latter was a large and representative exhibit collected by the Agricultural Society. The Royal Mail Company's exhibit from Trinidad, Jamaica, and Barbados drew forth considerable admiration for the manner in which it was staged as well as for its remarkable variety. Messrs. James Philip & Co. displayed various West Indian fruits, preserves, honey, and pickles. Messrs. L. Rose & Co.'s exhibit from Dominica included limes, lime juice, etc.

As has been announced, gold medals were awarded to Dominica and Barbados. The Jamaica fruit which received a gold medal was that exhibited by Mr. A. W. Gardner, of Kingston.

The *Gardeners' Chronicle* of December 17, 1904, in an article on this Exhibition, says: 'Another Colonial Exhibition will be held in March next, which will, no doubt, be more complete and more fully representative than the present one, wherein the pine-apples in particular were by no means good examples of what the West Indies can produce.'



INSECT NOTES.

Larger Moth-borer of the Sugar-cane.

This moth-borer of the Sugar-cane, to which reference was made in the *Agricultural News* (Vol. III, p. 426) as being a pest at plantation Enmore, British Guiana, has been identified by Entomologists in the United States as *Castnia licus*, and it is stated that 'this moth has been collected in Brazil, Ecuador, Demerara, Surinam, Trinidad, Upper Orinoco, Nicaragua, and Costa Rico.'

A note regarding its occurrence in Trinidad appeared in *Insect Life*, Vol. V, p. 268, quoted from the *Journal of the Trinidad Field Naturalist's Club*, February 1893. It was then recorded as a pest in banana plants, laying its eggs near the base of the plant in the dead leaves, and burrowing into the stem and up through the centre toward the crown or growing point. Dr. C. J. van Hall, Director of Agriculture for the Dutch West Indian Colonies, in reply to inquiries, states that a similar pest occurred some five or six years ago at Mariënborg, Surinam, where it was abundant for two or three years and then disappeared.

This would appear to indicate that *Castnia licus* is not a new pest to canes and bananas, and that it probably will not endure over a long period of years. It seems probable that parasitic and predacious forms of life soon learn to accept it as a host and as a source of food, and overcome it to such an extent that it disappears. It is believed that the butterfly migrates long distances, and fresh attacks of the larvae in canes or bananas probably result from these migrations.

A Poison Caterpillar.

During the recent Agricultural Conference at Trinidad one of the delegates made the acquaintance of a caterpillar that possesses an efficient defence in its poison hairs. His experience is given as follows:—

It was at the Pitch Lake that I found a large caterpillar feeding on the leaves of *Clusia rosea*. It was fairly common, several specimens being taken in a few minutes. It was a milk-white caterpillar with long, silky, reddish-brown hairs arranged in tufts in two rows down the back and two rows along each side. At the base of these long hairs are short, stiff spines. These are the poison hairs. A gentleman from Demerara said that the poison from this insect caused extreme pain and resulted in a swelling of the glands of the axils of the arms. I chanced to touch these poison hairs with the back of the right thumb and the back of two fingers of the left hand. The irritation from the stings was severe and was noticed at once. No swelling of the thumb or fingers was seen, and there was very little sign of inflammation. In about ten minutes pains were felt under the arm and in twenty minutes this pain was very severe. The pectoral muscles seemed drawn up, breathing caused sharp pains, and a feeling of general depression accompanied the other symptoms. In about an hour the pains began to subside, and in an hour and a half from the time of touching the caterpillars nothing was felt except the irritation on the thumb and finger. This continued till the time of retiring for the night some ten or

twelve hours from the time of the sting. On the following morning, however, the irritation had all passed away, and there were no marks to show that there had been any sting or inflammation. The latest sensation from this poison was that of a severe burn with steam or hot water just at the places on the thumb and fingers which had come in contact with the caterpillar. It is interesting to note that no pain was felt in the wrists and arms, and that the axils of the arms should have felt the influence of the poison so soon after its introduction into the thumb and fingers.

EDUCATIONAL.

Agricultural Instruction for Teachers in Jamaica.

The Board of Agriculture in Jamaica has issued a pamphlet dealing with the 'Annual Meeting of Elementary School Teachers for Agricultural Instruction at the Mico Training College and Hope Gardens,' January 1905.

The general arrangements are as follows:—

The Teachers will assemble on Monday, January 2, at 4.30 p.m., at the Mico Training College, when they will be addressed by the Hon. H. C. Bourne, Chairman of the Board of Agriculture.

7-9.30 a.m. Practical work and Demonstrations at the Mico Training College on Tuesdays, Thursdays, and Saturdays; and at Hope Gardens on Mondays, Wednesdays and Fridays by Messrs. W. Cradwick, W. J. Thompson and W. M. Cunningham.

11.30-2.30 Agricultural Science Course by Mr. Tever-sham.

Afternoon—On three afternoons each week (Tuesdays, Thursdays and Fridays) addresses on special subjects will be given at the Mico Training College. These addresses will commence at 4.30 p.m., and will be open to the public.

Evening—Messrs. Peet and Skyers will hold classes in Manual Work as prescribed by the Code.

The syllabus of practical work and demonstrations includes: the use of the line, the fork, and spade, trenching; the preparation of a seed bed; demonstrations on the chief crops of the island and the principles involved in their cultivation (cacao, coffee, sugar-cane, pine-apples, vanilla, bananas, citrus fruits, tobacco, etc.); tillage, drainage, manuring; and knife work (budding, grafting, etc.).

Special attention was to be paid to the laying out of school gardens. It is suggested that a systematic method should be followed, and a plan is given for a suitable $\frac{1}{4}$ -acre garden.

The Agricultural Science course is divided into two parts: (i) Elementary Science (Physics and Chemistry), and (ii) Agricultural Science. The latter includes a study of the plant (seed, root, stem, leaf, flower, and fruit); the feeding of plants; the soil; manures and manuring; propagation of plants; diseases and insect pests; foods and feeding of animals.

The lecturers at the afternoon meetings include His Grace the Archbishop, the Hon. Lt. Col. Pinnock, the Hon. Henry Cork, Mr. H. H. Cousins, Mr. Geo. Hicks, and others.

From reports received by last mail we learn that the teachers had entered upon their work with considerable enthusiasm, and the course is likely to be a very successful one.



BRITISH GUIANA: REPORT OF THE BOARD OF AGRICULTURE, 1903-4. By J. B. Harrison, C.M.G., Deputy Chairman.

An account is given of the principal subjects which have been discussed at the general meetings, as also of the subjects discussed by the Standing Committees of the Board.

The Standing Committees are as follows: (i) Finance and Executive, (ii) Stock, (iii) Library, (iv) Exhibitions, (v) Agricultural Education, (vi) Sugar-cane Experiments, and (vii) Subsidiary Products.

In accordance with the recommendations of the Stock Committee, a pure-bred Shorthorn bull and three Holstein cows were imported from Canada, and a Tamworth boar and two sows from Trinidad. Two thorough-bred stallions were imported from England in February 1904.

Exhibitions were held at Buxton, East Coast, and at Georgetown. Farmers' Competitions took place in the Victoria-Belfield district, in the Georgetown district, and in the island of Wakenaam.

Returns are published showing the number of acres under cultivation with the more important subsidiary products in British Guiana in 1903-4, and also the area under rice cultivation. These are as follows: rice, 16,670 acres; cocoa-nuts, 3,766; cacao, 901; coffee, 718; corn (maize), 746; cotton, 39; plantains, bananas, and ground provisions, 14,240 acres.

BRITISH GUIANA: REPORT ON THE AGRICULTURAL WORK IN THE EXPERIMENT FIELDS AND THE GOVERNMENT LABORATORY, 1903-4. By J. B. Harrison, C.M.G., Government Analyst and Deputy Chairman, Board of Agriculture.

This report deals mainly with experiments with the sugar-cane. Out of 2,825 seedlings obtained from the selected varieties, 1,420 were planted in the experimental fields. Tables are published showing the yields from the various seedlings.

General deductions from the manurial experiments are published. It is stated that these appear to be applicable not only to the Bourbon variety but also to the majority of the varieties submitted to experiment.

About 3 acres of land were devoted to experiments with a large number of varieties of rice. The imported varieties matured more rapidly than did the so-called 'Creole' variety, taking four months while the latter took nearly five. The results of the experiments are reported to be 'interesting and encouraging.'

The manurial experiments with cacao have not as yet given very satisfactory results; it is evident that they will have to be carried on for a longer period before satisfactory deductions can be made.

The details of the useful work carried on so successfully by Professor Harrison and his staff are likely to be of considerable value to members of the planting community.

DRAINAGE OF CACAO LAND.

The following is extracted from a report by the Hon. F. Watts, C.M.G., D.Sc., on a visit to Dominica in July and August 1904. The question of subsoil drainage is an important one for cacao planters in Dominica and doubtless is of importance also in connexion with the occurrence of the die-back disease caused by *Diplodia cacaoicola*:—

Upon my visit in December 1903 my attention was called to a large area planted in young cacao which was several years old and now should be in good bearing, instead of which the trees presented a very poor appearance and in most cases appeared to be slowly dying; the crop from them was negligible. My own impression was that the trees were suffering from want of drainage, though on the face of it this appeared improbable, for in places there was a steep cutting down to the river, and even at a little distance from this the trees presented a poor appearance. It was on a portion of this defective cacao field that I recommended the establishment of an Experiment Station. The first point was to drain the experiment plot very thoroughly, after which various manurial and cultural experiments were laid out. This work was done early in this year (January-February). Upon visiting the plot I found the most striking change in the appearance of the trees within the treated area. The trees presented a healthy, flourishing appearance; new growth was abundant and vigorous, the new foliage healthy and there was an abundance of blossom. I could not see any difference between the various plots to lead me to suppose that any of the manures applied had contributed to this result; it would appear that efficient drainage had caused the improvement. I have on more than one occasion drawn attention to the red soils of Dominica which contain but relatively small proportion of gravel and sand; these, when first taken up as virgin soils covered with a soft layer of forest mould, are usually in good condition and cacao and other trees grow well in them; this growth may be maintained if the cultivation and aeration of the soil can be kept up, but under the conditions of a cacao field there is danger of these soils becoming compact and unsuitable for cacao from the presence of excess of water in the subsoil (for cacao is a deep-rooting tree) even when situated on a good slope.

In a letter to the Imperial Commissioner dated December 20, 1904, Dr. Watts again refers to this point as follows:—

In my report on my visit to Dominica in July and August 1904 I drew particular attention to this point and instanced the cases of defective drainage and its disastrous effect on cacao at Melville Hall and South Chiltern: I also described the remarkable effects produced by draining the Melville Hall plots, the improvement being greater than I could have hoped for. I am informed that the work of draining is being extended and always with the same very marked improvement. Similar cases are under my observation at Blenheim.

I have repeatedly observed that on the somewhat close soils of Dominica, particularly upon the red soils, the surface soil may appear in good condition and the land may have a good slope leading one to suppose that drainage is perfect, yet on digging into the subsoil one finds the roots of the trees water-logged and often unhealthy. This condition is so unexpected as frequently to escape notice. It is, in my opinion, one of the greatest dangers threatening the Dominica cacao planter, for the cacao tree is deep-rooting and soon sends its roots below the well-drained surface soil.



GLEANINGS.

The Grenada *Government Gazette* for January 3 contains a list of plants for sale at the Botanic Station during the year 1905. These include fruit and economic plants, climbing plants, foliage and flowering plants, aquatic plants, palms, etc.

The *Journal d'Agriculture Tropicale* for December 1904 gives an account of the artificial drying of cacao. The article is based on the account given in the *West Indian Bulletin* (Vol. II, p. 171) together with other notes since published in the *Agricultural News*.

The stock of cotton at the ports of Great Britain to-day amounts to 847,550 bales, against 527,900 bales at the close of 1903, and consists of 765,080 American, 2,370 Brazilian, 44,010 Egyptian, 15,670 Peruvian, etc., and 20,420 East Indian. (Liverpool Cotton Association 'Annual Circular,' December 29, 1904.)

In the annual report on the villages under the control of the Central Board of Health, British Guiana, the Inspector states: 'Complaints about prædial larceny still continue as bitter as ever. I know of cases where industrious farmers have abandoned some of their lands rather than plant them for the benefit of thieves.'

Specimens have been received from the Secretary of the West India Committee of six sets of the picture post-cards already referred to in the *Agricultural News* (Vol. III, p. 364). The sets are as follows: (1) West Indian Views, (2) West Indian Life, (3) Barbados, (4) British Guiana, (5) Jamaica, and (6) Trinidad. These are sold, in packets of six, price 6d.

The highest point of the market for American cotton during the year was on February 2, when middling American was quoted 8.96d. per lb., and the lowest point on December 29, when it was quoted at 3.63d. per lb. The average value for middling American for the year is 6.6d. per lb. (Liverpool Cotton Association 'Annual Circular.')

Mr. C. A. Barber, Government Botanist, Madras, has recently proved to sugar-cane growers in Godavery that Rs. 80 an acre can be saved in the cost of cultivation by adopting the West Indian practice of tying the canes themselves together, with only an outer support of bamboos, instead of bamboo supports all through. (*Indian Planting and Gardening*.)

The movement for the extermination of mosquitos at Antigua, started by the Governor, is progressing. The object is primarily to disseminate knowledge concerning the relation of mosquitos to tropical diseases and to induce people to take active steps towards destroying mosquitos. Lectures, with magic lantern views, bearing on the subject are to be given. (*West India Committee Circular*.)

In the *Annual Report* on Jamaica for 1903-4 it is stated as a result of the hurricane of August 1903, there was more forking and trenching done than there would otherwise have been, whilst there was a larger planting for the next spring's crop than in any previous year.

The new buildings of the East Java Experiment Station were opened on October 8, 1904, by Mr. V. C. Coster van Voorhout, President of the directors of the Experiment Station. A full account of the proceedings, together with a photograph and plan of the new buildings, is given in a recent publication of the station.

A recent issue of *Indian Planting and Gardening* contains an article by Mr. H. Maxwell-Lefroy, Entomologist to the Government of India, on the subject of the danger of introducing insect pests. He suggests the fumigation of living plants with hydrocyanic gas, and gives directions for the use of benzine, carbon bisulphide, etc., by those who have not facilities for using hydrocyanic gas.

His Majesty's Consul at Batoum has recently addressed a letter to the Secretary of State for Foreign Affairs relating to the position of some 30,000 families of Turkish Armenian tobacco planters who have been ordered to leave the country. It is suggested that as these people are familiar with all labour connected with tobacco growing, they might be a desirable acquisition in colonies requiring skilled labour for agricultural purposes.

In answer to the question: 'What are the advantages of the shook swarm?' Mr. W. Z. Hutchinson, a prominent bee keeper in America, stated at the recent Chicago-Northwestern Bee Keepers' Convention that there was no advantage, except that it put the swarming at a time when the bee keeper could take care of it. He urged that the colonies be shaken only when the bees were making preparations to swarm. (*Gleanings in Bee Culture*, December 15, 1904.)

The progress and present prospect of Para and Castilloa rubber should justify the establishment of large Government plantations in suitable centres, which, in course of time, would be a valuable source of seed for general distribution throughout the protectorate. This would make a provision for Uganda in the future as a rubber-producing country. (Report of Director, Scientific and Forestry Department, Uganda.)

Jamaica products occupy an important position in the Christmas fruit trade this season. The famous thin-skinned oranges from that colony sold for from 10s. to 15s. per case. Jamaica mandarins are also excellent. In cases of sixty fruits they have sold for from 10s. to 14s. a case. These prices are a good gauge of the estimate placed upon their quality by trade buyers. It is a pity that more of them are not to be had for the festive season. No daintier fruit enters our ports. (*The Times*, December 23, 1904.)

The exports of sugar from British Guiana to America and Canada for the year 1904 were 787,259 bags; and for the same period to Europe 161,698 bags, 2,289 hogsheads, 11,031 puncheons of molasses, and 1,357 barrels of rum. The crop for the year 1904 is about 24,000 tons short of that of the previous year, but the better prices obtained, as the sugar season advanced, have more than outweighed this deficiency. (Messrs. Wieting & Richter's 'Market Report,' January 12, 1905.)

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report, dated December 8, 1904, on the position of drugs and spices on the London market, has been furnished by Mr. J. R. Jackson, A.L.S.:—

The dullness of the drug sales that has prevailed so long appears to have become chronic, and there seems at present very little prospect of any change for the better. Indeed, with the Christmas season close upon us, we can scarcely expect much attention to be given to drugs until trade settles down again into its normal channels after the holidays. For the moment, at the approach of Christmas, more business would naturally be expected in the spice trade, but at these sales nothing worthy of comment has occurred. In short, the Mincing Lane trade generally during the month has been very inactive; the chief point of interest indeed was the rise in the price of sugar which has entirely taken possession of the minds, not only of those immediately connected with the trade, but also of the consumer generally. For the moment sugar is the all-absorbing topic which, when the British taxpayer has had his grumble, will subside and the extra $\frac{1}{2}d.$ per lb. which is now being charged in the retail trade, will be paid as cheerfully as the lower figure has been hitherto. Considering the spice trade first, we record the following figures connected with it.

GINGER.

The month of November opened with the sale on the 2nd. with the offering of about 200 packages of Jamaica and about 700 packages of Cochin and Calicut. Of the former, 61 parcels of Jamaica were sold at prices from 29s. to 31s. 6d. per cwt. for common to good common; and the whole of the other offerings were bought in. A week later, the supplies offered were very small, no Jamaica being amongst them, and 17 bags only of Cochin meeting with purchasers at 20s. for small and medium washed-rough. On the 16th. a quiet tone still prevailed and still no Jamaica was offered; privately it was stated that fine qualities were scarce, notwithstanding that there were large stocks, which consisted chiefly of middling qualities commanding prices from 31s. 6d. to 32s. Of 690 bags of Cochin offered 150 sold, including fair brown Calicut, 21s.; and wormy washed, 17s.; good native cut being bought in at 40s. On the 23rd., again no Jamaica was offered, but a small quantity of unassorted cut Cochin sold at 46s. On the 30th., being of course the last sale of the month, out of 156 barrels of Jamaica offered, 86 were disposed of at the following rates:—Fair bright, 37s.; fair common, 30s.; and common, 27s. to 29s. The small quantities of Cochin and Calicut offered did not meet with purchasers.

SARSAPARILLA.

At the drug auction on November 10, 19 bales of grey Jamaica were offered and sold for 1s. 2d. per lb. without consideration of quality; 11 packages of native Jamaica were shown, but no public sale was effected; 9d. per lb. was the price asked for fair medium native red, and 10 $\frac{1}{2}d.$ was obtained for 8 bales of coarse lean and chumpy Lima Jamaica. On the 24th. grey Jamaica sold at about 1d. per lb. cheaper; 24 bales of Lima Jamaica were offered and 10 were sold, for medium coarse and part chumpy 10 $\frac{1}{2}d.$ being realized; 7 bales of native Jamaica were also offered, but were bought in at 8d. to 8 $\frac{1}{2}d.$ for ordinary dull red. At the same sale 11d. per lb. was realized for one seron of Honduras.

ARROWROOT.

On November 4, at the spice auction, 40 barrels of good manufacturing St. Vincent were disposed of at 1 $\frac{1}{2}d.$ per lb. On the 16th., a very large number of packages of St. Vincent were offered only 10 of which, 'Rex' brand, sold at 3d., while at the same auction 8 kegs of Bermuda were disposed of at 1s. 5d. per lb. On the 23rd., fair manufacturing realized 1 $\frac{1}{2}d.$ per lb. and sold to the extent of 20 barrels, while at the last auction, on the 30th., all the offerings were bought in.

KOLA NUTS.

Throughout the month kola nuts have maintained a steady price. In the middle of the month West Indian were quoted at 3d. to 3 $\frac{1}{2}d.$, and at the same sale some extra bold, bright washed sold at 4 $\frac{1}{2}d.$, some rather darker in colour at 4d., and some slightly mouldy 3d. per lb. On the 23rd., some small lots of West Indian were sold at the same rates as those quoted above, viz., 3d. to 3 $\frac{1}{2}d.$, and 6 packages of small to bold bright West Indian were disposed of at 3 $\frac{3}{4}d.$, and dullish at 3d. to 3 $\frac{1}{4}d.$ Two bags of good small West African from St. Thomé were also sold at 3d. per lb.

PIMENTO, NUTMEGS, MACE, ETC.

Of pimento there was a good supply throughout the month and only a quiet demand, prices being fairly steady at 2 $\frac{3}{8}d.$ to 2 $\frac{1}{2}d.$ for fair; 2 $\frac{3}{8}d.$ for greyish, and 2 $\frac{1}{4}d.$ for ordinary mixed. On the last day of the month a slightly firmer tone prevailed, the quantity disposed of being 270 bags.

Nutmegs and mace had both a quiet steady sale through the month, the former commanding somewhat lower rates than in the previous month. At the last auction about 500 packages of West Indian were sold at from about $\frac{1}{2}d.$ to 1d. per lb. less than previous rates, owing to the condition being wormy, and a large proportion consisting of long nuts.

At the commencement of the month there was only a steady demand for mace, at the sale on the 16th., however, a good supply of West Indian was disposed of at fair prices, including 1s. 9d. for fine pale. On the 30th., the following were the quotations for 70 packages of West Indian: good bold pale, 1s. 6d.; fair, 1s. 3d. to 1s. 4d.; ordinary, 1s. 2d., and 11 $\frac{1}{2}d.$ to 1s. 1d. for pickings.

Of other products of West Indian origin, 3 cases of distilled lime oil were offered and sold at 1s. 3d. per lb. and 2 tins of good quality papaw juice from Montserrat were bought in at 10s. per lb., 5s. being refused.

CARRIACOU LAND SETTLEMENT SCHEME.

The following note on the Land Settlement Scheme at Carriacou appeared in the *Board of Trade Journal* of December 22, 1904:—

Adverting to the notice published in the *Board of Trade Journal* of January 29, 1903, respecting a scheme for the establishment of peasant proprietors in Carriacou, the report on Grenada for the year 1903 states that so far, at all events, it may be claimed that the scheme has been a complete success, and with it a new era has opened for Carriacou. On October 1, 1904, an Ordinance came into operation which constitutes Carriacou and the adjacent islets (the largest of which, Petit Martinique, has a thriving community of about 900 souls) a district of the colony, and vests its local administration in a Resident Commissioner. The first holder of this office, Mr. G. Whitfield Smith, besides possessing considerable practical experience in the West Indies, has the advantage of special training in the Imperial Department of Agriculture, of which he was for some years the Travelling Superintendent.

MARKET REPORTS.

London,—January 3, 1905. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 29, 1904; and 'THE PUBLIC LEDGER,' December 31, 1904.

ALOE—Barbados, 15/- to 35/-; Curaçoa, 15/- to 37/6 per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.

BEES'-WAX—£7 to £7 10s. per cwt.

CACAO—Trinidad, 55/- to 63/- per cwt.; Grenada, 52/- to 55/- per cwt.; Dominica, 50/- to 53/- per cwt.; Jamaica, 48/- to 53/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.

COFFEE—Jamaica, good ordinary, 40/- to 41/- per cwt.

COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—4/- to 5/6 per barrel.

GRAPE FRUIT—6/- per case.

ORANGES—6/- to 7/6 per case.

PINE-APPLES—Jamaica, 4d. to 6d. each.

FUSTIC—£3 10s. to £4 per ton.

GINGER—Jamaica, fair bright, 37/-; ordinary to good ordinary, 27/- to 30/- per cwt.

HONEY—Jamaica, 17/- to 22/- per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/8; cake, 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £13 15s. per cask of 108 gallons.

LIME OIL—Distilled, 1/3 per lb.; hand-pressed, 2/6 to 2/9 per lb.

LOGWOOD—£4 2s. 6d. to £5; Roots, £4 to £4 10s. per ton.

MACE—Bold pale, 1/6; red, 1/1 to 1/2; broken, 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.

NUTMEGS—67's, 1/8; 86's, 10d.; 143's, 5d. per lb.

PIMENTO—2½d. per lb.

RUM—Demerara, 11½d. to 1s. 1d. per proof gallon; Jamaica, 1s. 10d. per proof gallon.

SARSAPARILLA—7½d. to 1/2 per lb.

SUGAR—Yellow crystals, 21/- to 23/- per cwt.; Muscovado, Barbados, 18/- to 18/6 per cwt.; Molasses, 15/- to 18/- per cwt.

SULPHATE OF AMMONIA—£13 7s. 6d. per ton.

Montreal,—December 9, 1904.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$22.00 to \$24.00 per M.

COFFEE—Jamaica, medium, 9c. to 9½c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 27c. to 29c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—Jamaica, \$3.60 per barrel; Dominica, \$3.75 per barrel; \$1.75 per box (duty paid).

PIMENTO—Jamaica, 5½c. to 6c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.40 to \$3.54 per 100 lb.

—Muscovados, 89°, \$3.10 to \$3.20 per 100 lb.

—Molasses, 89°, \$2.75 to \$2.85 per 100 lb.

—Barbados, 89°, \$2.85 to \$2.95 per 100 lb.

New York,—December 23, 1904.—Messrs. GILLESPIE Bros. & Co.

CACAO—Caracas, 12c. to 13c.; Dominica, 11c. to 11½c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 13¾c. per lb. (ex store).

COCOA-NUTS—Trinidads, \$25.00 to \$26.00 per M., selected; Jamaicas, \$26.00 to \$28.00 per M.

COFFEE—Fair to good ordinary, 8½c. to 9½c. per lb.

GOAT SKINS—Jamaicas, 59c. to 60c. per lb.

GRAPE FRUIT—Jamaicas, 1.50 per barrel.

ORANGES—Jamaica, \$3.00 to \$3.50 per barrel (stem cut).

PIMENTO—4¾c. per lb.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4¾c.; Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 14, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$11.00 per 100 lb.

COCOA-NUTS—\$9.00 per M. for husked nuts.

COFFEE—\$10.00 to \$12.00 per 100 lb.

HAY—90c. to 95c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00.

ONIONS—Madeira (stringed), \$4.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$2.40 per 160 lb. (retail).

RICE—Ballam, \$4.80 to \$4.85 per bag (190 lb.); Patna, \$3.25 per 100 lb.

British Guiana,—January 12, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$5.75 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14c. per lb. (retail).

—Creole, 11c. per lb.

DHAL—\$4.30 to \$4.40 per bag of 168 lb.

EDDOES—\$1.68 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Lisbon, \$4.50 per 100 lb. (ex store).

PEA NUTS—American, 6c. to 6½c. per lb. (retail).

PLANTAINS—28c. to 40c. per bunch.

POTATOS, ENGLISH—\$2.25 to \$2.40; picked, \$2.50 per barrel.

RICE—Ballam, \$4.35 to \$4.40 per 177 lb.; Creole, \$5.00 per white bag.

SWEET POTATOS—Barbados, \$1.20 per bag.

TANNIAS—\$1.68 per barrel.

YAMS—White, \$2.04 per bag.

SUGAR—Dark Crystals, \$3.12½ to \$3.16; Yellow, \$3.75 to \$4.10; White, \$4.50 to \$5.00; Molasses, \$2.75 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—January 12, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary \$11.70 to \$12.00; Estates, \$12.10 to \$12.25; Venezuelan, \$12.25 to \$12.60 per fanega (110 lb.).

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 8c. to 9c. per lb.

COPRA—\$3.15 to \$3.25 per 100 lb.

ONIONS—Stringed Madeira, \$4.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.30 to \$1.35 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; White Table, \$4.60 to \$5.50 per bag.

SUGAR—No. 3, \$2.25 to \$2.75 per 100 lb.

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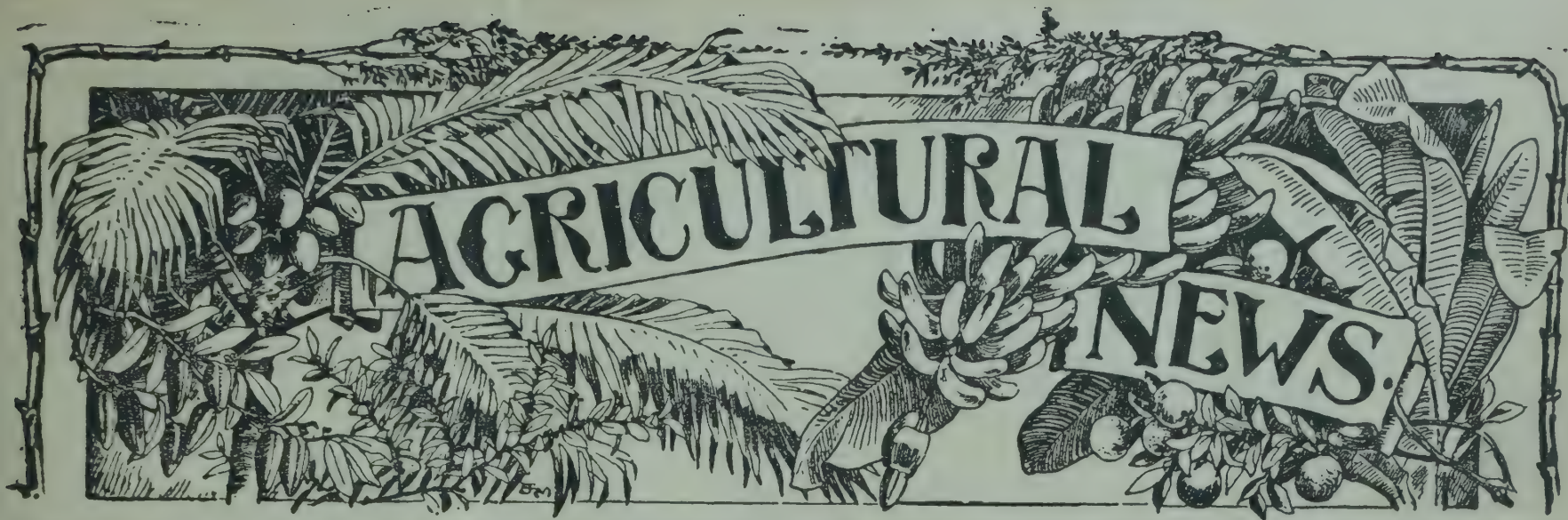
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Cotton Seed for 1905.



AST year arrangements were made by the Imperial Department of Agriculture to obtain cotton seed of good quality from one

of the best plantations in the Sea Islands for distribution to planters in the West Indies at cost price.

The total quantity of seed imported was 35,700 lb. In order to prevent the possibility of insect or fungoid pests being introduced, all the seed was carefully disinfected beforehand and it was distributed under such conditions as were likely to yield the best results.

The average cost of seed sufficient to plant one acre (6 lb.) was about 15d. 'In the Sea Island cotton districts the cost of selected seed for sowing is placed at 54c. to 58c. (or at the rate of 2s. 3d. to 2s. 5d.) per acre. In Egypt it is placed at 50c. (2s. 1d.) per acre.' Hence for an estate of 50 acres, seed of the best Sea Island cotton was placed at the disposal of planters in the West Indies for a little over £3, as against £5 12s. in the Sea Islands and £5 4s. in Egypt.

In one or two localities we understand the opinion has been expressed that the seed was 'mixed' and that it had not the appearance of Sea Island cotton seed of 'good crop' quality. Apparently this misconception arose from the fact that some of the seeds presented a slightly 'fuzzy' appearance and approached, on a cursory glance, some of the characteristics of 'Upland' cotton seed. As against the possibility of the seed being 'mixed' or having been tampered with in any way, we have in the first place to consider the high character of the proprietor of the plantation on which the seed was produced, and the assurance that the seed was true Rivers' Seed, and identical with what he planted himself. We have next the expert opinion expressed by Mr. E. Lomas Oliver that all the samples raised from Rivers' seed examined by

him exhibited the characteristics of true Rivers' cotton which had been purchased by his firm for the last fifty years and was well known to him. Further, we may refer to the experience of Mr. Carter Rey, of Anguilla, (quoted in the last issue of the *Agricultural News*, p. 21) who states: 'I have not been able to discover a single mixed variety in the fields planted with Rivers' seed; it is also notable that this cotton is more vigorous than the local variety.' Similar information has been received from other sources; whereas in no case has any planter shown that lint obtained from Rivers' seed, when carefully dealt with, has failed to reach the standard of good commercial Sea Island cotton.

In order to afford a still further and what should be regarded as a conclusive test of the merits of Rivers' seed distributed last year, all the slightly 'fuzzy' seeds were, in one instance, removed and sown by themselves. The plants raised from these supposed inferior seeds have since matured and they have produced a crop of cotton with the characteristics *both in lint and seeds* of true Rivers' cotton.

The final test will be the prices which will be obtained for cotton raised from Rivers' seed as compared with cotton raised from other seeds. We hope to refer to these later. In the meantime, the important point to settle is what kind of cotton seed is desirable to plant in these colonies for the crop of next season.

There can be no doubt that it must be Sea Island cotton seed, either imported or grown locally. The present position of the cotton market, where Upland cotton is quoted at less than 4*d.* per lb., leaves the planter no alternative but to continue to plant Sea Island cotton. The price of this has also fallen to some extent, but if, as is possible, good Sea Island cotton is likely to obtain about 1*s.* per lb.—more or less, according to the quality of the fibre—the profit to the planter should not be less than 5*d.* to 6*d.* per pound. In addition, the seed used for feeding purposes on the spot would be worth at the rate of about £2 an acre. The details on which these returns are based are given in *A.B.C. of Cotton Planting*, p. 14.

To return to the question: What kind of seed should be planted during the next season. In localities where Rivers' seed only has been planted, and the bushes have been maintained in good health and have yielded satisfactory crops, those who are prepared to undertake the risk might plant entirely with the local seed; but those who are desirous of keeping up

their reputation for first-class cotton are advised to retain a sufficient quantity of local seed for planting, say, one half of the area proposed to be placed under cotton next season and to obtain a fresh supply of Rivers' seed for the other half. This would be the safest course to adopt, as the loss, if any, from the use of the local seed would be counterbalanced by the probable gain from the new seed. It would also carry out the idea of gradually acclimatizing Sea Island cotton so as to produce a variety exactly suited to the conditions existing in the West Indies.

In all localities where more than one kind of seed has been used, and where cross-fertilization has probably taken place, or where the results have not been entirely satisfactory, it is recommended that all the seed planted in 1905 should be imported seed.

As announced in the last issue of the *Agricultural News* (p. 24), the Imperial Department of Agriculture is prepared to assist the cotton industry by making arrangements to procure a fresh supply of Rivers' Sea Island cotton seed to be delivered early this year. Those who desire a supply of this seed, which will be charged at cost price (5*c.* or 2½*d.* per lb.), are desired to communicate, without delay, with the officers of the Department in the colonies in which they reside.

In each case payment will be required beforehand. The seed will be disinfected on arrival and delivered in quantities to suit applicants. It is proposed to receive applications for new Rivers' seed up to March 18 next. After that date no applications for new Rivers' seed can be entertained by the Department.



SUGAR INDUSTRY.

Barbados Molasses Crop.

We reproduce from the *Barbados Globe* of January 25 the following review of the report of a Committee appointed by the Barbados Agricultural Society for the purpose of obtaining an estimate of the molasses crop:—

At the meeting of the Barbados Agricultural Society on October 28, Professor d'Albuquerque expressed the opinion that the fall in prices of molasses last season was due to the erroneous estimate made owing to the lack of statistics, and he strongly recommended that the Society should take steps to form a fairly correct estimate this year. The suggestion

was adopted, and a Committee was appointed for the purpose, and also to fix an opening price for molasses. On Friday last the Committee handed in its estimate which places the crop of sugar at 45,000 hhds., and of molasses at 30,000 puns. The opening price of molasses the Committee fixed at 17c., package included. This is not a final price. The Committee does not pretend to determine absolutely the market, nor does it represent any combine for that purpose. The opening price merely represents the figure below which, looking to ordinary conditions of demand and supply, molasses, in the opinion of the Committee, should not go. In other words, it is a valuable indication to the planter of what may be regarded as the legitimate price of his product, and has no bearing on any rise which might be brought about by speculation or later crop developments, or on any depression of the market which a combination of buyers may be able to effect.

Manufacture of Molascuit.

The following is extracted from an article in the *Demerara Argosy* of January 14:—

There can be no doubt that the manufacture of molascuit is making very satisfactory progress in British Guiana. The average price paid in England during the past six months was £4 per ton. In order to produce 1 ton of molascuit about 130 gallons of molasses, of a density of 44° to 46° Beaumé, are required, in addition to the megass meal, which is obtained by sifting the megass as it passes from the rollers, which have crushed the canes, to the furnace. The average cost of manufacture, including packages, local freight, lighterage, and other incidental charges, is \$4.50 per ton. To this must be added the cost of home freight, royalties, commission, etc., which averages about \$7 per ton. This leaves net proceeds to the manufacturer of \$7.70 [£1 12s.] per ton, equal to very nearly 6c. per gallon for the molasses used.

There are at the present time forty-five estates in this colony making sugar, but only a few of the larger estates are equipped with a plant for the manufacture of molascuit. It is a peculiar feature of this product that it can be made entirely by hand labour without the aid of machinery; but, whereas the average cost of hand manufacture is 10s. per ton, with a special plant of machinery the cost can be reduced to 60c. per ton. Molascuit as made here consists of about 75 per cent. by weight of molasses and about 25 per cent. by weight of megass meal. The mixed product contains from 50 to 55 per cent. of sugar and about 13 per cent. of moisture.

BOTANIC STATION, DOMINICA.

Supply of Budded Plants.

The following notice, dated January 14, 1905, has been inserted in the *Dominica Official Gazette*:—

Owing to the length of time required to bud and grow orange plants for sale, it is necessary that the Botanical Department should know early what number of budded plants are required for the coming season.

Planters requiring supplies of budded citrus stocks for delivery during the latter half of the present year are requested to send their orders to the Botanic Station not later than February 10.

No orders for budded plants for delivery during 1905 will be received after the date mentioned.

THE IMPORTANCE OF SPRAYING.

The following directions with regard to spraying diseased plants with insecticides and fungicides are extracted from a recent bulletin of the Cornell University:—

It should be remembered that in all cases success is dependent on the exercise of proper judgement in making applications. Prevention in the case of fungous diseases should be the watchword. Plant diseases are rarely cured, but they can frequently be prevented. Know the enemy to be destroyed, know the remedies that are most effective, and apply at the proper season. Be prompt, thorough, and persistent. Knowledge and good judgement are more necessary to success than any definite rules.

Spraying is an insurance. Spraying is no longer an experiment. It is an accepted practice, as tillage, pruning, and fertilizing are. It may not be necessary to spray every year, but the farmer should be prepared to spray every year. In case of doubt spray. See that pumps and rigs are in working order before ploughing time comes. Order your materials. 'Be ready.'

There is no one best pump or nozzle. There are best devices for particular kinds of work, depending on the size of the plants to be sprayed, the kind of spray to be used, and the extent of the operations. Get a good pump, one that works easily and smoothly, and is strong enough to make a fine spray when two lines of hose and four nozzles are used, if it is designed for field work; it is economy in the end. Look over the horticultural papers for advertisements of spraying outfits, and write for circulars. Power pumps are becoming more popular each year.

MOSQUITOS IN ST. LUCIA.

The following extract from a report by Dr. St. George Gray, Colonial Assistant Surgeon in St. Lucia, on the conveyance of disease by mosquitos, is instructive as indicating that an effort is being made in that island towards the extermination of these pests:—

Another dangerous place is the drain running into the northern end of the Botanic Gardens. I believe that this drain is the source of most of the malaria occurring at Barnardville and along the Darling Road. Morne Fortune abounds in anopheles pools which keep the Military Hospital well supplied with cases of malarial fever. There is a drain at the back of the village of Anse-la-Raye, which, at times, swarms with the larvae of anopheles. I have already mentioned this drain in my report.

Another notoriously unhealthy place was the Union estate at the beginning of the year, when work on the new buildings of the Agricultural School was commenced. At that time not a week passed without from two to four or more of the workmen being down with malignant malarial fever. Towards the end of April I visited the works with Mr. Mountjoy, the Architect, and found that the old estate canal was a typical breeding-place for anopheles. This and similar places were at once drained, and other pools filled in. Since then there has not been a single case of malarial fever originating on the estate. Just before the school opened, I went over the grounds with Mr. J. C. Moore, the Agricultural Superintendent, who has continued the work of draining and filling in of all useless collections of water, and I could not find a single mosquito larva. On the Choc estate, only a short distance away, and where there is still a great deal of malarial fever, I found numerous anopheles larvae, as well as those of other mosquitos.



WEST INDIAN FRUIT.

SEEDLESS LIMES.

The Hon. W. H. Porter writes from Dominica as follows in reference to seedless limes:—

I observed in the *Agricultural News* (Vol. III, p. 412) a paragraph to the effect that the Superintendent of the Royal Botanic Gardens at Trinidad will supply Botanic Stations with plants of the seedless variety of lime as soon as stock is available.

It may interest readers of the *Agricultural News* to learn that seedless lime plants are being propagated at the Botanic Station here from budwood supplied from my property, where a vigorous tree of this description has recently been discovered, and should a demand for plants arise it will doubtless be possible in a year or two to supply them in large numbers, here as well as at Trinidad.

DATE PALMS IN JAMAICA.

The following note from the Annual Report of the Director of Public Gardens and Plantations in Jamaica refers to the collection of Algerian date palms at Hope Gardens, of which mention was made in the *West Indian Bulletin*, Vol. V, pp. 147-8:—

The collection of date palms is in excellent condition. The plants have been regularly irrigated, and they have been constantly sprayed with Bordeaux mixture to stamp out the date fungus disease (*Graphiola phoenicis*).

The following numbers flowered from March to August 1903, all being females:—Nos. 182, 186, 187, 189, 191, 194, 195.

The following numbers flowered during February 1904, all being male plants:—Nos. 193, 196—(3 specimens). The flower clusters of the male plants have been saved to enable us to pollinate any female flowers that may appear later in the year.

A DISEASE OF CACAO.

The following note on a disease of cacao trees (*Diplodia cacaoicola*) appeared in the *Bulletin of Miscellaneous Information*, Trinidad, for January:—

This name has been given to a destructive fungus which attacks the pods of *Theobroma cacao* and destroys them. It was found some years since in some of the Windward Islands, but, up to a recent date, it had not actually been detected in Trinidad. A few weeks since, however, a pod was sent to this office infected with a fungus, which, on reference to authorities, has been provisionally determined as *Diplodia cacaoicola*. So far, however, the disease has not appeared to

be prevalent or likely to do any considerable amount of damage; but it will be wise to take steps to prevent its spread wherever it appears.

The measures laid down in various papers for the control of the more common *Phytophthora omnivora* are also effective for this disease, viz., the collecting and destroying of all diseased pods, and the burying or burning of the empty 'shells' when the beans are extracted. This process of control is, I am pleased to record, now being carried out on many of the best Trinidad estates with successful results. In one case a prominent planter who has adopted it for some time past has stated it to be highly successful, and that it has resulted in saving a very large proportion of his crop for 1904.

CACAO INDUSTRY OF SURINAM.

The following extract from the *Consular Report* on the trade of Dutch Guiana for the year 1903 refers to the unsatisfactory condition of the cacao industry in consequence of the serious character of the 'Witch Broom' disease:—

The cacao industry which was the most important in the colony, showed no improvement during the year, the total crop being 2,020 tons, against 2,187 tons in the previous year and 3,004 tons in 1901. The prospects of the industry are very far from bright; many of the proprietors were unable to provide work for their indentured labourers, and had not the Government been able to employ a large number of them on the railway construction, the state of things would have proved disastrous to many of the proprietors and to the colony generally. In the meanwhile, of course, the cacao on these plantations suffers, and unless the disease dies out of itself the prospects are most dismal, as these under-cultivated estates act as nurseries for the disease and spread infection to their more fortunate neighbours.

The exports of this article from Surinam during the last few years have been as follows: 1901, 3,163 tons, valued at £192,445; 1902, 2,355 tons, £135,423; 1903, 2,224 tons, £116,795.

It may be mentioned that at the recent Conference at Trinidad Dr. van Hall, the Director of Agriculture for the Dutch West Indian Colonies, gave the results of his experience with the 'Witch Broom' disease, confirming the great loss caused by it to planters. Spraying experiments had been commenced, but he could not as yet record any definite results.

COTTON INDUSTRY.

Profits of Cotton Growing in Barbados.

In reference to the note on the above subject in the last issue of the *Agricultural News* (p. 21), the following summary of the expenditure and receipts is likely to be useful in showing clearly the profits obtained:—

<i>Corn and Cotton.</i> —			£	s.	d.
Cost of cultivation	...	...	\$ 521.94 =	108	14 9
Total receipts	...	...	2,471.84 =	514	19 4
Net profit (22 acres)	...	...	1,949.90 =	406	4 7
Profit per acre	...	...	88.63 =	18	9 3
<i>Cotton only.</i> —					
Profit per acre	...	...	79.82 =	16	2 7

Sea Island Cotton Market.

The following is extracted from the latest report, dated January 21, received from Messrs. H. W. Frost & Co., of Charleston and Savannah, in regard to the Sea Island cotton market:—

The sales for the week consisted very largely of odd bags on a basis of fully fine, 23c.; fine, 21c.; tinged and stained, 20c. and 17c., the buying being principally from England. The unsold stock of about 3,000 bales is composed chiefly of planters' crop lots held at 28c. to 30c., for which there is at present a very limited inquiry. Factors are very anxious to sell, but are refusing to accept any lower prices at present. The character of the odd bags coming to market is tinged and stained, showing the last of the crop, and very little really sound cotton can be selected. The Beaufort cotton has been marketed only in a very limited way, and the owners are very desirous of selling before shipping.

We quote: stained and tinged, 17c. to 20c.; fine, 21c.; fully fine, 23c. to 24c.; extra fine, 27c. to 28c.; extra-fine crop lots, 28c. to 30c.; and extra-extra-fine crop lots at 35c. to 50c. per lb.

Cuba.

The Consular Report on the trade of Cuba for 1903, dated, Havana, November 5, 1904, contains the following reference to the prospects of cotton growing in that island:—

The numerous experiments which have been made down to the present time, some of them on quite an extensive scale, have clearly shown that a superior class of cotton can be raised in Cuba.

The only question which remains to be decided is whether there is sufficient labour available at reasonable prices for picking the cotton if planted in considerable quantity. Should no serious difficulty be experienced in this direction, there is every reason to expect that the industry will soon come to be of great importance, and that large shipments will be made to the United Kingdom, thus increasing the commercial movement between the two countries and greatly benefiting the direct carrying trade in British bottoms.

I should mention that the variety of cotton found to grow best in Cuba is that known as 'Sea Island,' which is of fine quality and long staple.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop:—

From St. Vincent, Mr. Sands reports: 'Favourable weather having been experienced, picking operations have not been kept back, and constant supplies of seed-cotton have come forward. The Central Cotton Factory has been continuously at work, and 49 bales of cotton have been delivered for shipment. The cotton ginned has been well prepared and appears to be of excellent quality.'

Mr. Shepherd writes from St. Kitt's that picking was going on rapidly all over the island, and that on some of the estates all the cotton had been gathered. Caterpillars had not been troublesome, and the cotton was too far advanced for much damage to be done by the leaf-blister mite. Ginning was going on at Spooner's Factory and would soon begin at Stone Fort and Pump Bay Factories.

Mr. Hollings reports that the weather in Nevis had been abnormally dry since October, but the cotton crop did not seem to have been adversely affected by the drought, and picking was at its height.

Mr. Fishlock writes from the Virgin Islands, under date January 23, that cotton was coming in from Virgin Gorda, 1,666 lb. of seed-cotton having been delivered in the previous week. The gin had been running satisfactorily, but the aermotor worked rather fitfully. In the five days during which it had worked, 400 lb. of lint had been ginned.

As the result of his visits of inspection to cotton fields in Antigua, Mr. Patterson reports the prevalence of fungoid diseases in most of the fields, but that, on the whole, the plants were giving fair returns.

In Montserrat, also, diseased bolls were to be seen. Picking was being pressed on, Mr. Jordan states, and 75,000 lb. of seed-cotton had been harvested up to January 16. Satisfaction was being expressed on all sides at the appearance of the staple obtained from the Rivers' seed imported by the Imperial Department of Agriculture. Six bales (of 400 lb. each) had been shipped from one estate.

Exhibits of Colonial-grown Cotton.

Among the exhibits at the Colonial Produce Exhibition, opened in Liverpool on January 10, was a display of colonial-grown cotton provided by the British Cotton-growing Association, under the supervision of Mr. C. M. Wolstenholme. The *Textile Mercury* quotes the descriptions accompanying twelve specimens, from which we extract the following:—

9.—Grown from native West Indian seed, sold at 6 $\frac{3}{4}$ d.; value of fair Peruvian at same date, 6 $\frac{3}{4}$ d.

10.—Grown from Egyptian seed in Barbados (West Indies), sold at 6 $\frac{1}{2}$ d., August 17, 1904; value of good fair brown Egyptian at same date, 7 $\frac{1}{8}$ d.

11.—Grown from American seed in St. Vincent (West Indies) sold at 6.54d.; middling American, same date, 6.54d.

12.—Grown from Sea Island seed in Barbados, sold at 17d. on June 11 last; value of Sea Island at same date, 17d.

It is also stated:—

The best results in colonial cotton growing have been obtained in the West Indies. The sample shown at the Colonial Exhibition from Sea Island seed has a soft and lustrous appearance, a long and regular staple, is as silky to the touch as Sea Island, and under the microscope strong and well-knitted cellular walls are shown, while the natural twist is perfect.



VANILLA INDUSTRY.

The following interesting article on vanilla, by Mr. J. R. Jackson, A.L.S., appeared in the *Gardeners' Chronicle* of December 24, 1904:—

Some curious facts have recently come to hand regarding the vanilla cultivation in Tahiti and Mauritius. The exports from Tahiti to the United States have been declining, apparently from the inferiority of the product. The small trade that now exists seems to be generally in the hands of Chinamen, who encourage trade with the natives by accepting options on the vanilla output, and ultimately receive the beans in the crudest form and proceed to cure them. The name Tahiti, as applied to vanilla, is said to be sufficient to condemn the exports from the colony, and the American Consul has endeavoured to enlist the interest of the officials in a plan for compulsory inspection and grading under the control of the Government. The matter, however, has not been looked upon favourably by the officials, though it has by many planters and merchants. The Consul therefore warns importers of vanilla from Tahiti carefully to examine any beans that they have reason to suspect of being cured by Chinese, as these traders are accustomed to pick up beans that have been rejected by others as totally unfit for market, soak them in salt water or let them remain for a time in cocoa-nut oil, and then pack them in the bottoms of tins containing better grades. Chinamen will buy even mouldy vanilla pods and mix them with sound ones. It is stated, however, that there are a few companies of native planters who are trying to put a high-grade vanilla on the market.

With regard to Mauritius, a better tone accompanies the information on the cultivation of the plant in that island, where, it is stated, a Committee was recently appointed to make recommendations for amending the laws relating to vanilla. The following notes are gathered from the report of this Committee: That vanilla grows luxuriantly in Mauritius and constitutes an important source of revenue. There is practically no disease on fully-grown plants, and the failures in certain plantations are mostly due to bad cultivation. There are some 3,000 vanilla planters in the island, but the majority of these are small proprietors who have a few plants in their gardens or orchards. The exports of prepared vanilla in 1902 amounted to 7,712 lb., and the cultivation is capable of considerable extension. In spite of care taken to save the pods, they are subject to the depredations of thieves, whom, owing to the nature of the product, it is very difficult to detect. With the view, therefore, of protecting the planters, it is recommended that stringent regulations be made for the licensing of all sellers and purchasers of vanilla, the affixing of a special mark by growers on their green pods, and the giving of notice to the authorities before vanilla is gathered. It was also recommended that a special inspector be appointed for the purpose of reporting on all vanilla plantations, preparing houses, etc.

In the Seychelles, the vanilla cultivation has for some time been very successful, and large quantities have been offered for sale in the London market, mostly realizing good prices. At the first auction of the year, on January 13, the quantity of vanilla offered was so large that the sale was not completed till late on the following day (the 14th.). As many as 2,860 tins were put up for sale, the total weight of which was about 15½ tons, and constituted a record bulk, the chief portion being from the Seychelles. Nearly the whole

of this quantity was sold during the two days at fairly good prices, fine quality realizing from 12s. to 15s. 6d. per lb.

It is worthy of note, in connexion with the foregoing remarks, that the fear expressed some years back that the synthetic production of vanillin would ruin the vanilla culture, has not yet been fulfilled. The numerous and increasing uses of vanilla for flavouring purposes in chocolates and other kinds of confectionery are accountable to a large extent for the present very large consumption of vanilla.

ARBOR DAY FOR BARBADOS.

The Hon. Forster M. Alleyne, the senior delegate of the Barbados Agricultural Society at the fifth West Indian Agricultural Conference, presented a report on the Conference to the Society at its meeting on January 27. The following is an extract from the report in which Mr. Forster Alleyne suggests that the Agricultural Society should take steps to procure the observation of Arbor Day in Barbados as has been done in the other islands:—

In response to the President, Dr. Watts described how Arbor Day had been kept in Antigua during the last three years. The President explained that he did not attach so much importance to the planting of trees on this day in connexion with re-afforestation, but he thought it most valuable to place an object-lesson before the people, and especially before children, how a tree ought to be planted and cared for. We have no Arbor Day in Barbados, and it is worth consideration whether this Society might not take steps to procure the observance of one. We have many bare spaces around Bridgetown which would be all the better for some trees, while if some of our glaring roads could be transformed into avenues, travelling would become much more pleasant. Trees might also be planted near the schools in the country, so that the children might watch and take an interest in their growth.

CACAO IN THE GERMAN COLONIES.

The following extracts are taken from the *Consular Report* on the German Colonies for 1902-3:—

Cacao plantations exist in the Cameroons and in Samoa. The former show a considerable increase in production, the latter are not yet sufficiently advanced to allow of export.

The exports from the Cameroons were valued at £33,907 in 1902 and £27,657 in 1901, or an increase in 1902 of £6,250 worth.

Togoland.—The cultivation of cacao also appears to prosper, and is extending among the natives in the districts of Misahöhe and Atakpame. The German Togoland Company are also devoting attention to cacao cultivation on their plantations, and seem to have good prospects of success.

The general position of the cacao plantations in the Bismarck Archipelago and Kaiser Wilhelmsland on January 1, 1903, is 12 productive acres.

Samoa.—The area planted with cacao was almost doubled within the year and amounted in 1903 to about 2,000 acres, of which, however, only about 124 acres were sufficiently advanced to yield a crop. Whether cacao planting will prove a success in Samoa is still doubtful. In any case it requires capital and great perseverance, and the report of Dr. Wohltmann, the cacao expert who was sent out by the Colonial Economic Committee, was not altogether encouraging. The value of the exports was £564 in 1902-3 and £534 in 1901-2, or an increase of £30 worth.

THE COLONIAL AND INDIAN EXHIBITION, 1905.

The plan given below and the explanatory text appeared in the *West India Committee Circular* of October 25, 1904. We are indebted to the courtesy of the Secretary of the West India Committee for the privilege of reproducing this:—

The plan below is given to show the space which has been provisionally allotted to the West India Committee for the West Indian Court at the Colonial and Indian Exhibition to be held at the Crystal Palace in 1905. It will be seen that the space allotted is in a most advantageous position immediately in front of the central entrance to the Palace

Court, occupying an aggregate space of 2,500 square feet. The co-operation of Rhodesia and British Central Africa has also been secured.

The issue of the *Circular* for January 17, 1905, has the following further note in connexion with this exhibition:—

A meeting of the General Exhibition Sub-Committee was held on Wednesday 11.

Correspondence with the various colonies was read, and hope expressed that some definite decision might soon be

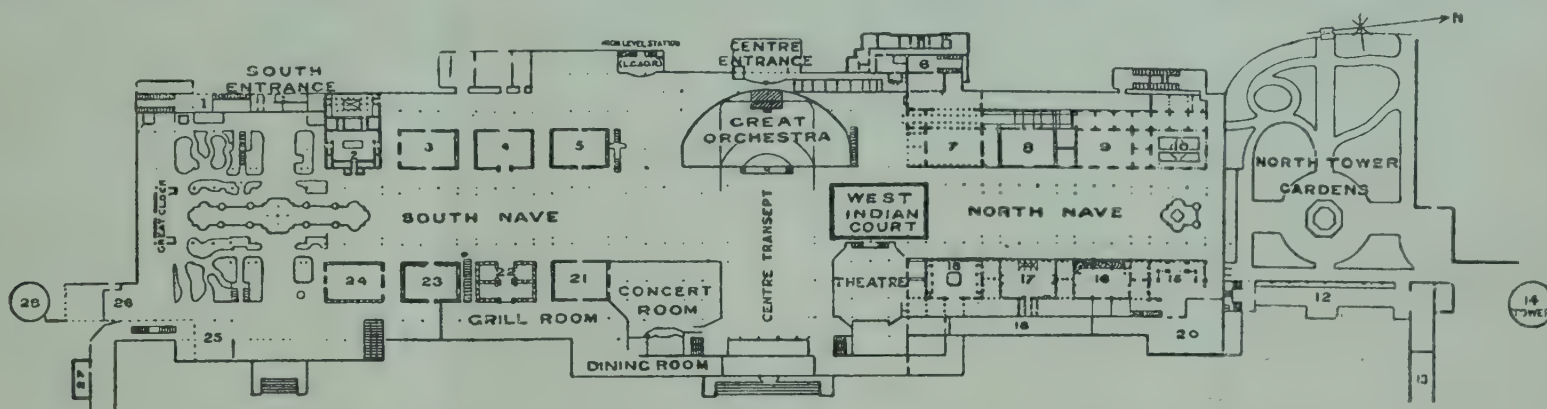


FIG. 1. PLAN OF PROPOSED COLONIAL AND INDIAN EXHIBITION, 1905.

[From the *West India Committee Circular*.]

and adjacent to the centre transept. It is understood that the corresponding space on the opposite side of the transept will be allotted to Canada, which will, it is expected, take a space of no less than 25,000 square feet. India is to be represented, and the Australian colonies are taking separate action. Victoria has contracted for 1,500 square feet, and New South Wales and New Zealand are each arranging to have 2,500 square feet, and the promoters have also had hearty encouragement from Australia and Fiji. The West African colonies will be immediately behind the West Indian

arrived at in the participating islands as to the size and nature of the respective exhibits, in order that there might be no delay, which so often mars the effects of these displays. A sub-committee was appointed to proceed with the allotment of space, and will get to work immediately. Meanwhile, it is very desirable that the colonies should hasten on the arrangements, as the sugar-canes, etc., for decorative purposes must reach us not later than the third week in March, and the exhibits themselves at the end of the second week in April.

ROAD-SIDE PLANTING OF RUBBER TREES.

The following is an extract from a letter from the Administrator, Dominica, to the Imperial Commissioner of Agriculture, dated December 21, 1904:—

I have just been reading the last number of the *Agricultural News*. What an excellent paper it is. It seems to improve with every number. In connexion with the article on Road-side planting of Fruit Trees (Vol. III, p. 413) it may interest you to know that we have followed out that idea here for some time past. About fifteen months ago I caused rubber plants of two varieties (*Castilloa* and *Funtumia*) to be set out for a distance of nine miles all along one side of the Imperial road. The two varieties alternate the whole way and number about 2,500. They start at an altitude of 1,500 feet, and as the road goes up to 1,800 feet and then gradually down to 450 feet, we hope to have, in a few years, a very clear illustration showing at what elevation and under what conditions, as regards soil and exposure, rubber thrives best in Dominica. Most of the plants are, already, of good size and appear to be flourishing. Generally speaking, *Castilloa* seems to be best, as the *Funtumia*, though very vigorous does not stand wind well. In nine or ten years time, these trees will give the Imperial road a very handsome appearance, and ought to yield sufficient rubber to pay for its up-keep. The cost of cultivating the plants is very small, and in another two years, they will take care of themselves.

AGRICULTURAL EDUCATION AT BARBADOS.

The following note has been forwarded by the Rev. J. E. Reece, M.A., Inspector of Schools, Barbados:—

The lectures delivered by Dr. Longfield Smith at four centres were attended by a large number of teachers and assistants who were much interested and benefited, and were thereby better equipped for giving lessons in their schools. A grant has been made for the purpose of purchasing simple apparatus so that during this year some of the teachers will be able to give simple experiments and make their lessons more interesting and instructive. At the beginning of 1904 the Education Board increased the premium grant for a pass in the teaching of Agriculture so that now a pass in this subject, if practical work is shown, is of equal value with the pass in Reading, Dictation, and Arithmetic, and at many schools on the day of the Premium Examination we have seen a fair show of ornamental and economic plants grown in boxes and pots. The difficulty of obtaining land has been a great obstacle in providing school gardens, but in the few that exist it is pleasing to see the care and attention bestowed upon the plants, and how much is done with the small quantity of land available for this purpose.

At the Show held at Lower Estate in January 1904 fewer exhibits were made than on former occasions, possibly from local disadvantages, but the exhibits were distinctly better than those shown at any previous Exhibition.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 31 of this volume.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue deals with the question of cotton seed for planting in the West Indies during 1905. Planters are advised to plant half the area proposed to be placed under cotton with local seed from the best of the present Sea Island crop and the other half with new Rivers' seed to be imported for planters by this Department.

An estimate of the Barbados sugar and molasses crop, prepared by a Committee of the Agricultural Society, is published on pp. 34-5. Following this is an interesting note on the cost of manufacturing molascuit.

Under the heading 'West Indian Fruit' on p. 36 will be found notes on Seedless Limes, Date Palms in Jamaica' and on Cacao.

The extracts from reports of local officers published on p. 37 will show that the prospects of the cotton crop are still bright. In most of the islands the ginneries are at full work.

An interesting article on the vanilla industry, written by Mr. J. R. Jackson for the *Gardeners' Chronicle* is reproduced on p. 38.

The plan of the proposed Colonial and Indian Exhibition to be held at the Crystal Palace in 1905 shows the excellent position that has been allotted to the West Indies (p. 39).

Several interesting insect notes appear on p. 42. On the following page are notes on some fungoid diseases.

Shipment of Cotton from the West Indies.

We desire to impress upon cotton growers in the West Indies the desirability of avoiding the shipment of odd lots of cotton. Not only is it difficult for the brokers to effect the sale of these, but low prices are likely to be the result.

In reference to this matter, Mr. C. M. Wolstenholme, of Liverpool, writes to the Imperial Commissioner of Agriculture as follows:—

'You do not inform me whether my proposed method for account sales would be acceptable to planters. I really cannot treat 5,000 bales in separate units; I notice they are beginning to ship odd bales already from some of the islands.'

Forthcoming Agricultural Shows.

During the next few weeks a number of Agricultural Shows will be held in the West Indies. A list, with dates, of those that are being held under the auspices of the Imperial Department of Agriculture has already been published in the *Agricultural News* (Vol. III, p. 422). The first of these will be the shows in the Leeward Islands, viz., at Dominica on Thursday, February 23; at Montserrat on the following day, and at Nevis on Tuesday, February 28.

The arrangements for the show to be held at St. Vincent are now well advanced, and March 9 has been fixed as the date of the show. The Agricultural Show at Grenada will be held on March 16 and 17.

It may also be mentioned that a large and important show will be held under the auspices of the Trinidad Agricultural Society at Port-of-Spain on February 14, 15, 16, 17, and 18. At the conclusion of this show an auction sale of live stock, produce, and other exhibits will take place.

Agriculture in Cuba.

According to the *Consular Report* on Cuba for 1903, the sugar planters have been extending their plantations. The number of tons produced during the last few years has been as follows: 1900-1, 635,856 tons; 1901-2, 850,181 tons; and in 1902-3, 998,878, while the estimated crop for 1903-4 was 1,050,000 tons.

In regard to the tobacco industry it is stated that the crop of 1903, though not unusually large, was of excellent quality, affording a good proportion of wrappers. Opinions differ as to the advisability of growing tobacco under shade: although the texture of the leaf is improved, complaints are made that shade-grown tobacco is deficient in flavour. The value of the exports of tobacco and its products in 1903 amounted to £5,208,464, as against £5,080,835 in the previous year.

Among minor products the exportation of fruit has made great strides, the exports increasing in value from £71,116 in 1899 to £442,700 in 1903. The exports of cacao showed an increase of 5,162 cwt. over those of the preceding year, and the export of cabinet woods was largely increased on account of the opening up of new forests by the railway.

Exports of Surinam.

From the *Consular Report* on the trade of Dutch Guiana for the year 1903 we extract the following particulars with regard to the exports of agricultural produce from the colony:—

The most important industry is the cultivation of cacao. Mr. Consul Pigott's remarks in this connexion are published elsewhere in this issue (p. 36).

The sugar crop was somewhat below the average, but the yield was, on the whole, satisfactory. The exports were 7,492 tons of sugar and 105,935 gallons of rum, the total value being £90,987.

The amount of balata (370 tons) brought to the coast was again in excess of that of the previous year. The value of this was £61,795.

The coffee exports amounted to 238 tons of the value of £6,964. This was Liberian; a small quantity of the Arabian variety is also grown.

It may also be mentioned that there was a considerable increase in the amount of rice produced, 442 tons against 304 tons in the previous year. It is stated that, considering the large area of land suitable and available for this crop, it is to be regretted that so little attention has been given to it; practically all that is produced is grown by the British Indian settlers, who, as a rule, cultivate only small patches.

West Indian Bulletin.

The third number of Volume V of the *West Indian Bulletin* is issued to-day. It contains a number of interesting articles on general subjects. The first of these is a memorandum, prepared by his Honour the Administrator of St. Kitt's-Nevis, on the 'Muscovado Sugar Industry in Barbados and the Leeward Islands.' Mr. Bromley discusses in detail the cost of producing sugar by the muscovado process in comparison with the cost by the Central Factory system. The comparison is in favour of the factory system.

The next article contains full information, compiled from most recent publications, upon the subject of the 'Extraction and Preparation of Rubber.' Reference is made to the results of the experimental cultivation of rubber trees in the West Indies.

Cotton growers in these islands will find useful information in the article on the 'Fertilizing and Feeding value of Sea Island Cotton Seed.' Comparisons with Upland seed show that the Sea Island seed has a higher fertilizing value and is also superior as a food-stuff, being richer in protein and nitrogen-free extract. In this issue of the *Bulletin* full information is supplied in reference to the methods of soil inoculation for leguminous plants devised by the U. S. Department of Agriculture.

Another useful article is the account of the 'Sugar-cane Industry in Hawaii.' Full particulars, extracted from official reports, are given in relation to cultivation, manuring, irrigation, and yields of sugar.

This number also contains several shorter articles of an interesting character. It can, as usual, be obtained of all agents of the Department, price 6d., post free 8d.

Mosquitos and Malaria.

In this issue of the *Agricultural News* (p. 35) we publish a note from a Colonial Office Report (Miscellaneous, No. 27), 'Selections from Colonial Medical Reports,' in relation to efforts being made in St. Lucia towards the extermination of mosquitos. Special mention is made of the good results following drainage and filling up of pools.

In this connexion it is of interest to record the success that has accompanied the employment of stringent measures in the direction of sanitary precautions among the American troops serving on the Isthmus of Panama. So successful have these measures been that the Brigadier-General in command has recently reported that the health of the troops was remarkably good. 'The compulsory employment of mosquito nets prevented, to a large extent, inoculation by mosquitos. The proportionate number of cases of fever was remarkably small, having in view the records of previous commands in Panama, and the cases that did exist responded quickly to treatment. There were no deaths in the command.'

It is also reported that 'in this considerable detachment of officers and men, encamped on the Isthmus since January 1904, the total percentage of sickness reported was but 4.05, of which 3.10 was chargeable to malaria. Not a single case of yellow fever occurred.'

Nitrogen-fixing Organisms.

The *Agricultural World* of January 7 contains interesting correspondence, which appeared recently in an Irish newspaper, with reference to bacterial cultures used for the inoculation of the soil. The reply to a letter addressed to the U. S. Department of Agriculture by the Department of Agriculture for Ireland contains information which may briefly be summarized as follows:—

The organisms for the common legumes, such as alfalfa, peas, beans, clovers, vetches, etc., will be distributed to applicants desirous of aiding in testing the efficiency of these organisms in different parts of the United States. As a general rule, the quantity sent will be sufficient to inoculate about 2 bushels of seed. Full directions for use are supplied with each package. The bacteria are beneficial only in connexion with leguminous plants, and with them only where the proper nodule-forming organisms are lacking in the soil.

Reference is made to this subject in a note in the *Agricultural News*, Vol. III, p. 51; while a full account of the work that has been carried on in the Laboratory of Plant Industry, of the U. S. Department of Agriculture, in connexion with the preparation of cultures of nodule-forming organisms, will be found in the *West Indian Bulletin*, Vol. V, no. 3, issued to-day.

Cultures have been obtained from Washington by the Imperial Department of Agriculture and will be used in connexion with alfalfa. As alfalfa has rarely been grown with good results in the West Indies, this experiment will be watched with interest. The results will be published in due course.



INSECT NOTES.

Coffee Scale Insect.

Dr. H. A. Alford Nicholls, C.M.G., of Dominica, recently sent to the Head Office of the Imperial Department of Agriculture some leaves of Liberian coffee attacked by a scale insect which he says is new to his experience.

Examination shows it to be *Lecanium viride*, known in Ceylon as the Green Bug of coffee. Mrs. Fernald, in her *Coccidae of the World*, records this insect from Ceylon, Mauritius, and Brazil, and it has been sent to this office from Egypt. Its native country is not, however, known. Mr. E. E. Green, Government Entomologist of Ceylon, considers that it has been introduced into that country.

Dr. Nicholls reports that 'it appeared some months ago on abandoned Liberian coffee trees at St. Arment and it spread to lime trees in the vicinity. I have kept it in check by spraying with kerosene oil emulsion which is fatal to the insect in its younger and more tender stages.'

A sharp watch should be kept on this insect and vigorous measures taken to suppress it on its first appearance on lime, cacao, or coffee estates.

Directions for Preserving Gall Material.

Dr. A. Nalepa, of Vienna, who is an authority on the eriophyoid mites, writes that dried gall material is generally unfit for careful study, as is also alcoholic material. The following directions for the preservation of gall material and mites, are taken from Dr. Nalepa's letter:—

A portion of each kind of infested plant should be preserved in weak spirit and a portion dried for the gall herbarium. The mites for careful study are got out of the galls in this manner:—The mite-infested material is cut into small pieces, 1 mm. to 3 mm. wide, and placed in a tall glass cylinder, wrapped with paper to keep out the light, and left to dry. The mites will crawl out of the galls, and after eight to twelve hours acid alcohol (3–5 drops of hydrochloric acid to 100 c.c. of 50 per cent. alcohol) is poured in, and the whole well shaken. The alcohol is poured through a sieve into a beaker, and the gall material returned to the cylinder for a second washing. Fresh alcohol should be used each time. The alcohol is allowed to stand till all the sediment is at the bottom of the beaker; the alcohol is poured off, and the sediment containing the gall mites is saved in a small vial in about 60 per cent. spirit, and carefully labelled.

Hardbacks.

The following notes on the strength of the common hardbacks (*Ligyris tumulosus*) may be of interest. This common insect is a ground beetle, the larva lies under ground feeding on roots and other vegetable matter. After emerging from the pupa case, it is supposed that the adult beetle forces its way to the surface. To do this considerable strength is required. The three experiments given here show that the hardback possesses great strength,

although it is by no means certain that these figures represent the limit of its strength.

(1) A hardback was harnessed with a piece of thread to a small card. The thread passed over the thorax between the first and second pairs of legs and under the body. The beetle and its card drag were placed on coarse card board. Weights were placed on the drag to the amount of 4.0 grammes. The beetle weighed .265 grammes.

(2) A hardback was placed under an inverted glass dish 54 mm. in diameter, and 13 mm. deep. In this case the beetle crowded against the side of the dish and getting firmly braced raised head and prothorax to start the load then walked along pushing the dish. Weights were placed on the dish amounting to 20 grammes which with the weight of dish, 17.4 grammes, made a load of 37.4 grammes. This beetle weighed .265 grammes, and the test was made on fine blotting paper.

(3) The same beetle was used under a small metal box with a glass top. The box was 39 mm. in diameter and 6 mm. deep. The beetle's body was 7 mm. thick so that the top of the box rested on its back and only a portion of the edge of the box rested on the blotter on which the test was made. The weight of the box was 6.25 grammes, and 100 grammes weight was placed on it, making a weight of 106.25 grammes.

In the first experiment the proportion of weight of insect to weight of load was .265 gr. to 4.09 gr., or 1 to 15.43. In the second, .265 gr. to 37.4 gr., or 1 to 141.1. In the third 3.65 gr. to 106.25 gr., or 1 to 400.

The extraordinary strength of these little animals will be better realized when it is stated that, under similar conditions to those existing in the first two experiments a man would be able to draw only 86 per cent. of his total weight and a horse 67 per cent. It should be mentioned that in the third experiment a part of the weight is carried and a part pushed.

LECTURES IN ECONOMIC BOTANY.

The following is the syllabus of a course of lectures 'On recent investigations in Economic Botany' which were to be delivered, under the auspices of the University of London, at the Chelsea Physic Garden on Fridays, during the Michaelmas Term, 1904, by Mr. W. G. Freeman, B.Sc., A.R.C.S., Superintendent of the Colonial Collections of the Imperial Institute:—

Lecture I. (November 11, 4.30 p.m.).

General.—Scope of Economic Botany. Working organization. Past results. Present-day questions. *Sugar-producing plants*.—Sugar-cane. Cultivation and manufacture of sugar.

Lecture II. (November 18, 4.30 p.m.).

Sugar-cane. Improvement. Bud variation. Chemical selection. Seminal variation.

Lecture III. (November 25, 4.30 p.m.).

Sugar-cane. Importance of factors other than sugar content. Disease resistance.

Lecture IV. (December 2, 4.30 p.m.).

Sugar-beet.—Summary of past work. Improvement effected by seed selection. Composition as affected by environment. General summary of sugar production.

Lecture V. (December 9, 4.30 p.m.).

Cotton.—Source. Other vegetable cottons. Improvement of cotton.

Lecture VI. (December 16, 4.30 p.m.).

Improvement of cereals, especially of Indian corn.

FUNGOID DISEASES.

Coral-spot Disease.

The following note is extracted from Leaflet No. 115, published by the British Board of Agriculture and Fisheries, on Coral-spot disease caused by *Nectria cinnabarina*. It will be remembered that cacao canker is caused by a similar and closely allied fungus, so that the preventive measures given for the British disease can also be made use of in the case of the West Indian one:—

One of the most common and most generally distributed of British fungi is that to which the name of Coral-spot disease has been given. The first stage of the disease takes the form of bright, coral-red warts, which are about the size of millet seed, and are thickly scattered over the surface of dead or dying branches of the tree attacked. These red warts are very conspicuous, and at one time this condition of the fungus was considered to be an independent plant, and called *Tubercularia vulgaris*. At this stage numerous and exceedingly minute spores are produced, and readily scattered by the wind or by insects. At a later stage the coral-red changes to a rusty-brown colour. The surface becomes rough with projecting points and a second form of fruit is produced.

PREVENTIVE MEASURES.

1. Whenever diseased branches are observed they should be removed and burned without delay, as after infection recovery is impossible, and any delay in removal permits the formation of spores and probable infection of neighbouring plants.

2. Fallen branches, etc., are often literally covered with the bright, coral-pink warts of the *Nectria*, and should then at once be destroyed.

3. When pruning, it is a wise precaution to protect every cut or damaged surface with a coat of gas-tar, and also to remove and trim the ends of branches broken by the wind, or by other agency.

Bacterial Disease of Tomatos.

The following is the report of the Mycologist on a bacterial disease of tomatos that made its appearance last year at the St. Lucia Agricultural School:—

Microscopic examination of the diseased tissues points to the disease being of bacterial origin. Such a disease, caused by *Bacillus solanacearum*, has been reported from several localities in the United States.

The first prominent indication of the disease is the sudden wilting of the foliage, which may occur first on a single shoot, but finally affects the whole plant.

Subsequently, if the plant is young and not very woody, the stem shrivels, changing to a yellowish-green and finally to brown or black. The vascular bundles become brown before the shrivelling takes place. The organism attacks the parenchyma of the pith and bark, converting nearly the whole interior of soft stems into a mass of broken-down cells mixed with bacteria. The host plants are tomato, potato, and egg-plant, possibly also other solanaceous plants. Insects are largely responsible for the spread of the disease.

As preventive measures, the destruction of all leaf-eating and leaf-puncturing insects is the first thing to be considered. Early and complete removal of diseased plants, rotation of crops and selection of seed from plants grown where the disease is not prevalent are other suggestions of possible value in preventing the spread of the disease.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture is due to arrive at St. Lucia on February 22 where he will attend a meeting of the Agricultural Society and confer with members in regard to the prospects of cotton and other industries.

The Imperial Commissioner will be present at the opening of the Agricultural Show at Dominica on February 23; at the Agricultural Show at Montserrat on February 24; and at the Agricultural Show at Nevis on February 28. Sir Daniel Morris will return to Barbados on March 3 next.

It is probable that the Imperial Commissioner of Agriculture will be present at the opening of the Agricultural Show to be held at St. Vincent on March 9; and, if his engagements permit, he may be present at the Agricultural Show to be held at Grenada on March 16 and 17.

Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist on the staff of the Imperial Department of Agriculture, will proceed by next mail (February 13) to Antigua to undertake an investigation of the 'Black boll' in cotton. Mr. Lewton-Brain will probably also visit Montserrat for the same purpose, returning to Barbados on March 3 next.

Consequent on the departure for Fiji of Mr. C. H. Knowles, B.Sc., Mr. W. H. Patterson, Curator of the Botanic Station at Antigua, has been provisionally transferred to the post of Resident Master of the Agricultural School at St. Vincent. Mr. Patterson arrived at St. Vincent on January 31.

Mr. A. J. Jordan, Curator of the Botanic Station at Montserrat, has been transferred to the Curatorship of the Botanic Station at Antigua in succession to Mr. W. H. Patterson. Mr. Jordan arrived at Antigua on February 1.

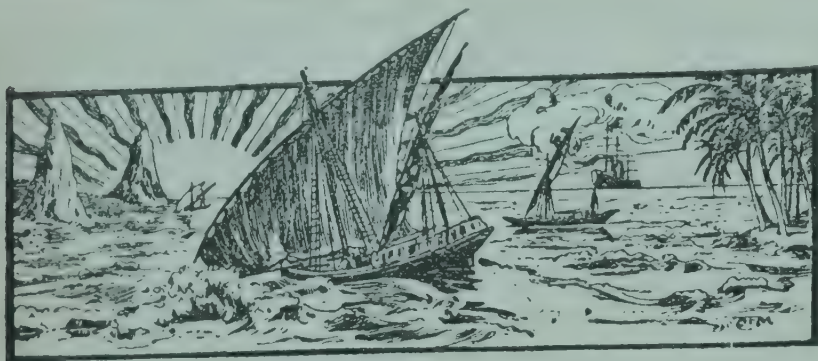
RUBBER TREES IN JAVA.

The following note on the cultivation of rubber trees in Java appeared in the U. S. *Monthly Consular Reports* for June last:—

Hevea brasiliensis (Para rubber) is not yet under proper cultivation in the Netherlands India, and the Director of the Botanical Institute at Buitenzorg informs me that it is barely beyond the experimental stage at the present time. It is expected that it will be successfully cultivated after some time. Of this rubber plant there were 2,325 under cultivation in the Netherlands India in 1903.

Ficus elastica is largely cultivated, and yields a product of first-class quality. This rubber plant is cultivated and thrives well from sea-level to 3,000 feet altitude and on any kind of soil. Of this plant there were 164,376 under cultivation in the Netherlands India in 1903.

The *Castilloa elastica* plant is also cultivated in the Netherlands India, but without any satisfactory results, and it is, therefore, of little importance here. In 1903 there were 4,176 plants of this species under cultivation in the Netherlands India.



GLEANINGS.

Mr. H. Millen, Curator of the Botanic Station at Tobago, writes that scrap rubber, obtained from trees of *Castilloa elastica*, was recently valued at 3s. 6d. per lb.

As a result of three visits to the island of Bequia, Mr. Sands has come to the conclusion that lands planted there in Sea Island cotton must be manured as they have for a long time been worked in provisions.

It is notified that the lectures on agricultural science for teachers in British Guiana are to be resumed. The lectures will be given at three centres, in Essequibo, Berbice, and Demerara, respectively.

Arrangements have been made for holding a course of demonstration lessons for teachers at the Government Laboratory, British Guiana, and also for a course in practical agricultural work in the Government School Garden at Bourda.

According to the *Agricultural World*, an important and successful experiment has been made at the Kidderminster Infirmary with a new serum for the treatment of anthrax, discovered by Professor Sclavo, of the Royal University of Siena, Italy.

Mr. John Belling, B.Sc., writes from St. Kitt's as follows: 'An old specimen of the Traveller's Tree (*Ravenea madagascariensis*) is fruiting at Buckley's estate in this island. Fertile seed has previously been produced in St. Kitt's.

It is desirable to mention that in all cases where dollars and cents are referred to in connexion with notes in the *Agricultural News* on cost and profits of cultivation, etc., the dollar may be taken at its par value, that is, \$4.80 to the pound sterling. One cent is equivalent to $\frac{1}{2}d.$; hence 100c. equal 4s. 2d. (1 dollar).

Dr. J. Boeke, who was in Barbados during the past fortnight, is the delegate of the Dutch Government for the investigation of the marine resources of the Dutch West Indian Colonies. Dr. Boeke will proceed to Curaçao where he will spend four or five months before visiting the other Dutch islands.

In reference to the note in the *Agricultural News*, Vol. IV, p. 12, with regard to a concession granted by the Government of British Honduras for the exploitation of pine products, the following extract from the *Chamber of Commerce Journal* is of interest: 'Perhaps one-third of the area of British Honduras is pine ridge, and, though the trees are not of great size, the wood is very heavy and rich in sap.'

During the past fortnight 6 bales of West Indian cotton have been imported. Medium fine is quoted 4.6d. per lb. and Sea Island, medium fine, 12d. per lb.; fine, 13d. per lb. and extra fine, 15d. per lb. (*West India Committee Circular.*)

The new American Breeders' Association which meets this month at Champaign, Ill., promises to deal effectively with the improvement of plants and animals by scientific methods. Its watchwords are 'Biologists study living things and breeders improve living things.'

At a meeting of the Trinidad Agricultural Society on January 31, a discussion took place on the subject of the cane-farming industry. A resolution was proposed asking the society to make every effort to place the industry on a 'firm, satisfactory, and permanent footing.' The discussion was adjourned till February 7.

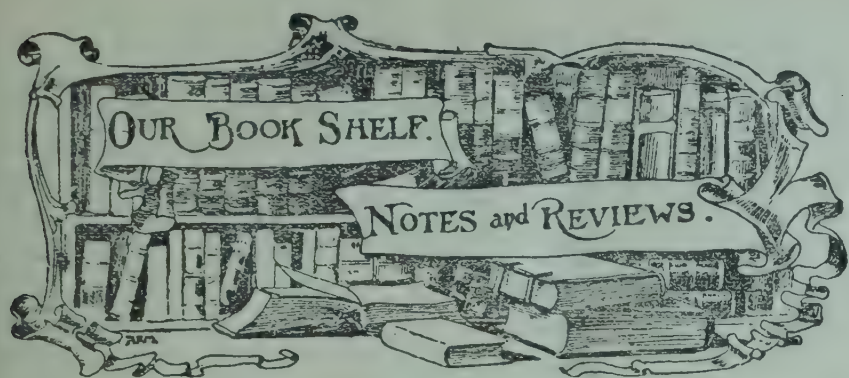
According to *Farmers' Bulletin* No. 12 of the Philippine Bureau of Agriculture, the production of Manila hemp has been for more than half a century the most important industry of the Philippine Islands. The exports for the year 1903 were valued at \$21,701,575, or 66 per cent. of the total exports. The present position and future prospects of the industry are very encouraging.

'We are very glad that the fruit exhibited by Barbados and Dominica gained the gold medal. We are told that the judges were very favourably impressed by the excellence of the bananas. The fruit from Dominica was sent to us for repacking. The grape fruit was some of the best we have seen.' (Extract from a letter from Messrs. Wm. Pink & Sons, Portsmouth.)

The 'artificial honey' which is being foisted on the British market is described in the *British Bee Journal* as 'nothing more than glucose flavoured with real honey, and to some people is even preferable to the genuine article.' It is, however, a fraud on the consumer to charge him the price of real honey for glucose (prepared by means of sulphuric acid and starch) which is not a food in the ordinary use of the term.

A leaflet (No. 121) has recently been issued by the Board of Agriculture on the 'Construction of Pigsties.' The following points are urged: (1) the sloping floor should be made of concrete, (2) the walls of brick rather than of wood—in case wood has to be used, sheets of zinc should be screwed on the inside to preserve the walls from damp and destruction by the pigs, (3) for the roof, tiles, slates, or thatch could be employed, (4) careful provision must be made for drainage.

The following is quoted from a circular issued by Messrs. James Philip & Co. in respect to their exhibit at the Royal Horticultural Society's recent exhibition: 'Fruits of the orange family were largely in evidence, comprising the huge shaddock, the better-known "pomeloes" grape fruit (often called "forbidden fruit," for nearly every one bears what may be likened to three finger-prints on its surface).' It would be interesting to know whether any of our readers have noticed these markings and have attached any importance to them. Possibly they are only the result of contact with neighbouring fruits.



THE BOOK OF TRINIDAD: Edited by T. B. Jackson. *Trinidad: Muir, Marshal & Co., Port-of-Spain. 1904.*

This volume consists of a series of articles by various writers on subjects connected with the 'Pearl of the Antilles.' Considerable attention is paid to the agricultural side, for not only are two excellent articles—'The Industrial Resources of Trinidad,' by Professor Carmody, and 'Forest Resources of Trinidad' by Mr. C. F. Rogers—reproduced from *Industrial Trinidad*, issued by the Board of Management of the Victoria Institute, but there are also included an article on 'A day at the Usine St. Madeleine' and another on 'The Cacao Industry of Trinidad.'

The descriptions of the various trips and excursions appear to be good and the book is copiously and well illustrated throughout. In fact we consider the editor is to be congratulated not only upon his choice of illustrations but also upon their excellent quality, some of the pictures of plants and crops being distinctly superior to those usually met with in books of this kind.

SUN PICTURES OF THE ANTILLES AND BRITISH GUIANA: By Algernon E. Aspinall, B. A., Secretary, West India Committee. *London: The West India Committee Rooms, 15, Seething Lane. Price 2s. 6d.*

This book, which is dedicated by special permission to Mr. Joseph Chamberlain, has been published with the object of popularizing the West Indies, and making them better known to the Mother Country. It contains many reproductions of photographs of West Indian life and scenery, which were taken by Mr. Aspinall on his visit to these islands in 1899-1900, and which have been for some time appearing in the *West India Committee Circular*.

A feature of this book is the general information, in a brief and popular form, as to the general aspects of the colonies, the hotels, means of conveyance, sports, social clubs, and principal sights of the various colonies, which should make it an interesting and useful guide for tourists.

Sun Pictures of the Antilles is bound in stout board covers and is excellently got up in every way. As readers of the *West India Committee Circular* will be aware, Mr. Aspinall's photographs not only make very good pictures but are distinctly typical of West Indian life and scenery.

HOUSE, GARDEN, AND FIELD: By Professor L. C. Miall, F.R.S., *London: Edwin Arnold, Maddox Street, W., 1904. Price, 6s.*

The sub-title of this book describes it as a collection of short nature studies. It is intended as a guide to the observation of live plants and animals, and deals with the structure and habits of a number of the commonest forms of life.

The high scientific standing of the author, who is Professor of Biology in the University of Leeds, and the quality of his previous works on nature study, ensure that

this book possesses thorough scientific accuracy and also that it is so written that it can be used by anyone interested in nature study, with or without a technical scientific training. The points upon which the author lays most stress are, firstly, the encouragement of observation, and secondly, the development of reasoning powers.

The book, as has been pointed out above, deals with the commonest forms of life. This, of course, refers to conditions in England, and, so far, the work is less well adapted for naturalists in the West Indies. Some of the lessons, however, such as those on 'The Human Hand,' 'Invisible domestic Servants,' 'House-flies,' 'Bananas,' etc., can equally well be used anywhere in these islands. Other chapters can easily be adapted to tropical plants and animals.

The book is well illustrated by many figures, drawn by Mr. A. R. Hammond, in most cases direct from nature.

ST. VINCENT ARROWROOT.

In reference to the note in the *Agricultural News* (Vol. III, p. 217), in which mention is made of the suggestion of the *Grocers' Monthly* to secure a judicious advertising of St. Vincent arrowroot, the following extract from the *St. Vincent Sentry* is likely to be of interest:—

Thanks to the enterprise of Messrs. D. K. Porter & Co., (the local arrowroot growers whose exhibit at the Agricultural Show, held in March 1904 under the auspices of the Imperial Department of Agriculture for the West Indies, winning the first prize, secured for them the Department's Diploma of Merit) the old custom is now giving place to better and more business-like methods. This firm is now advertising the celebrated 'Three River's Brand' of pure arrowroot in leading papers in Scotland, and widely distributing advertising matter throughout the country in general in a laudable attempt to introduce this wholesome West Indian food in the homes of all.

The progress of pure St. Vincent arrowroot in the British markets has hitherto been somewhat checked by the high prices asked for this article by retailers, and the prevalence of the opinion that it was only used as an invalid's diet. It is hoped that the publication of the recipes of delicious dishes which arrowroot is capable of making will modify this opinion. It is desired to impress upon readers that arrowroot is invaluable as a food and makes excellent blanc-mange, puddings, and many other domestic dishes; and it only needs a trial to convince the general public of this fact.

Under the arrangements now happily adopted by Messrs. D. K. Porter & Co. in regard to packing and shipping from St. Vincent, ready prepared for the retailer, buyers are now afforded the advantage of obtaining an original packet of arrowroot at a very reasonable price.

Shipment of Minor Products from Barbados.

By the R. M. S. 'Trent' which sailed for Southampton on Saturday last, the Imperial Department of Agriculture shipped 719 bunches of bananas, 35 bales cotton, 2 barrels potatoes, and 1 barrel of yams, against 623 bunches bananas, 24 bales cotton, 7 barrels potatoes and 1 barrel of yams, the quantity shipped on the 14th. instant. Messrs. H. E. Thorne & Son, Ltd., also shipped by the same steamer 132 crates containing 150 bunches bananas, and 12 bales cotton, as against 10 bales cotton and 124 crates bananas, the amount of their previous shipment. (*Agricultural Reporter*, January 30.)

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice market for the month of December:—

The dullness, amounting almost to depression, in the drug market, which is proverbial during the month of December and particularly so on the near approach of Christmas and during the succeeding holidays, was no exception to the rule in the closing days of 1904, and a similar quietness was felt, though not quite so severely, in the spice markets. A very small proportion of the articles offered during the month came from the West Indies, consequently our record will be somewhat meagre.

GINGER.

In the matter of ginger, in which the Jamaica product has for sometime past shown an upward tendency, little or none has appeared in competition with that from other sources. At the first spice sale, on December 7, 850 packages of Cochin and Calicut were offered, only 100 of which were disposed of at lower rates than prevailed in the preceding month, including small and medium washed rough mouldy Cochin, 16s. to 17s. A week later the market was still dull, though some 1,050 packages of Cochin and Calicut were offered and only a small portion sold at easy prices including ordinary small wormy Cochin at 15s., while small to bold Calicut was bought in at 25s.

NUTMEGS AND MACE.

With regard to nutmegs and mace there was very little demand for either at the beginning of the month, the prices being somewhat easier than in November; at the second sale, on December 14, a still easier tone prevailed, fair reddish West Indian mace selling at 1s. 1d. to 1s. 2d., and pickings at 10d. to 11d. per lb.

SARSAPARILLA, KOLA, TAMARINDS, ETC.

The only offerings of sarsaparilla were made on the 8th., when 21 bales of Lima Jamaica were placed on sale, and 5 sold at 10½d. per lb. for coarse and part chumpy. Dull to fair red native Jamaica was bought in at from 8d. to 11d. There was no grey Jamaica offered. At the same sale 1 bag of good West Indian kola nuts was disposed of at 4d. per lb.; also 5 casks of dry Barbados tamarinds at 5s. per cwt., and 3 casks of fair West Indian unworked lime juice at 9d. per gallon. Annatto showed a slight advance, 3 bags of good bright Madras selling at 7d., and 4 bags of dullish fair at 6d.

Canada.

The following is Mr. J. Russell Murray's monthly report, dated January 14, on West Indian produce in Canada:—

The opening of the year brings with it a strong spirit of hopefulness. Financial and trading reports show that for the close of the year settlements were good; the retail trade was very active and stocks depleted, indicating that the wholesale houses will be able to buy heavily for spring trade. The winter has thus far proved very moderate, and in great contrast to the severity of last year.

STEAMSHIP COMMUNICATION.

The West Indian contract is now occupying the attention of the commercial corporations and the Dominion

Government. The Corn Exchange and the Board of Trade of Montreal, and the Manufacturers' Association at Toronto have unanimously passed resolutions which have been duly forwarded to Ottawa, supporting the proposal that Montreal be the summer terminal port of the West India steamship line. The St. John, N.B., Board of Trade has passed a resolution asking that in the new contract the speed be increased from 10 knots to 13 knots, and that the size of the steamers be at least double that of those at present in use. The Royal Mail Steam Packet Company, Messrs. Elder Dempster & Co., and Messrs. Pickford & Black are the firms who are reported to be the principal competitors. The opinion is general that the new contract must afford a much greater outlet for Canadian produce. The entire question, however, is under most careful consideration at Ottawa, and a much improved service between Canada and the West Indies will be the outcome.

SUGAR AND MOLASSES.

The market continues in the same unsettled condition. The European beet market, after a few days' steady advance, declined 3d. this week, but recovered on the following day, and further sharp advance took place closing to-day at 16s. 1½d. Several cargoes are due to arrive via New York from Demerara, Fiji, and Trinidad. Local purchasers are reported of 6,000 tons 96° centrifugals, Trinidads and Demeraras, at \$3.31 and \$3.43 respectively, c. & f. New York; 69° muscovados at \$3.01, duty paid, were offered, but obtained no buyers, being considered too high. During the past month prices of refined granulated have been advanced, in sympathy with New York, 37½c. per 100 lb. The market remains very firm and a steady advance is anticipated, owing to the reports of short crops from all sugar-producing centres and the increase of consumption in Europe.

A good, firm market for molasses is general, and prices remain very firm; about 1,400 puncheons changed hands for refiners' interests, and the grocery firms report a steady trade. Prices locally have advanced from 28c. to 30c. for Barbados in second hands, and Antigua is quoted at 27c., but of the latter there is really no stock. There is every probability of good prices for early shipment. The last shipment from Antigua, to our care, continues to be referred to as one of the best that has arrived here.

COCOA-NUTS, SPICES, FRUIT, ETC.

The market for cocoa-nuts is fairly supplied, and a business in this line is usually quiet in the early months of the year, no change of prices can be looked for. Trinidad nuts are a little lower in New York.

Nutmegs remain steady at last month's rates. Jamaica pimento is without inquiry, and offers of ordinary at 5½d. were declined. A small parcel of fair, bold berry was closed at 5¼c., duty paid.

The consumption of West Indian fruit is at its lowest, only a few pine-apples and bananas are on the market, and quotations are nominal.

The market for coffee remains steady at advanced prices, but little business is being done.

New Cacao Experiment Plot at Tobago.

Mr. Henry Millen, Curator of the Botanic Station at Tobago, writes: 'Two acres of land have recently been taken over from Mr. H. Smith, of Caledonia estate, for a cacao experiment plot. This estate is situated in a good cacao growing district, where small proprietors have purchased Crown Lands and also estate land. The establishment of such a plot is likely to be instructive to all interested in cacao cultivation.'

MARKET REPORTS.

London,—January 17, 1905. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' January 13, 1905; and 'THE PUBLIC LEDGER,' January 14, 1905.

ALOES—Barbados, 15/- to 35/-; Curaçoa, 15/- to 37/6 per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.

BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.

BEES'-WAX—£7 to £7 10s. per cwt.

CACAO—Trinidad, 56/- to 65/- per cwt.; Grenada, 52/- to 54/6 per cwt.; Dominica, 50/- to 53/- per cwt.; Jamaica, 48/- to 54/- per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.

COFFEE—Jamaica, good ordinary, 40/- to 41/- per cwt.

COTTON—West Indian Sea Island, medium fine, 12d.; fine, 13d.; extra fine, 14d. per lb.

FRUIT—

BANANAS—4/- to 5/6 per bunch.

GRAPE FRUIT—5/- to 6/- per case.

ORANGES—5/- to 7/- per case.

PINE-APPLES—St. Michael's, 1/9 to 3/- each.

FUSTIC—£3 10s. to £4 per ton.

GINGER—Jamaica, fair bright, 37/-; ordinary to good ordinary, 27/- to 30/- per cwt.

HONEY—Jamaica, 17/- to 22/- per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/8; cake, 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £13 15s. per cask of 108 gallons; hand-pressed, 2/6 per lb.; Distilled Oil, 1/2½ per lb.

LOGWOOD—£4 2s. 6d. to £5; Roots, £4 to £4 10s. per ton.

MACE—Pale, 1/3 to 1/6; red, 1/2 to 1/3; broken, 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.

NUTMEGS—62's, 1/6; 80's, 11d.; 120's, 5½d. per lb.

PIMENTO—2½d. per lb.

RUM—Demerara, 1s. to 1s. 2d. per proof gallon; Jamaica, 1s. 10d. per proof gallon.

SARSAPARILLA—7½d. to 1/2 per lb.

SUGAR—Yellow crystals, 24/6 to 26/- per cwt.; Muscovado, Barbados, 19/- per cwt.; Molasses, 16/- to 19/- per cwt.

SULPHATE OF AMMONIA—£13 7s. 6d. per ton.

Montreal,—January 14, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 28c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.95 to \$4.00 per 100 lb.

—Muscovados, 89°, \$3.45 to \$3.55 per 100 lb.

—Molasses, 89°, \$3.05 to \$3.15 per 100 lb.

—Barbados, 89°, \$3.20 to \$3.30 per 100 lb.

New York,—January 20, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Dominica, 11c. to 11½c.; Grenada, 11½c. to 11½c.; Trinidad, 12c. to 12½c. per lb.

COCOA-NUTS—Trinidads, \$24.00 to \$25.00 per M., selected; Jamaicas, \$26.00 to \$28.00 per M.

COFFEE—Jamaicas, 9½c. per lb. (ex store).

GOAT SKINS—Jamaicas, 59c. to 60c. per lb.

GRAPE FRUIT—Jamaicas, \$2.50 to \$3.00 per barrel.

ORANGES—Jamaica, \$3.25 to \$3.75 per barrel (stem cut).

PIMENTO—4½c. per lb.

SUGAR—Centrifugals, 96°, 5½c.; Muscovados, 89°, 4½c.; Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 28, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$10.50 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.00 to \$12.00 per 100 lb.

HAY—90c. to 95c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00.

MOLASSES.—18c. per gallon.

ONIONS—Madeira (stringed), \$4.00 to \$4.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$2.40 per 160 lb. (retail).

RICE—Ballam, \$4.80 to \$4.85 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR.—Muscovados, 89°, \$3.00 to \$3.10; Dark crystals, 96° \$3.50 per 100 lb.

British Guiana,—January 26, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$6.10 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14c. to 15c. per lb. (retail).

—Creole, 12c. to 14c. per lb.

DHAL—\$4.40 per bag of 168 lb.

EDDOES—\$1.68 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Lisbon, \$4.50 per 100 lb. (ex store).

PEA NUTS—American, 6c. per lb. (retail).

PLANTAINS—32c. to 48c. per bunch.

POTATOS, ENGLISH—Picked, \$2.50 to \$2.75 per barrel.

RICE—Ballam, \$4.35 to \$4.40 per 177 lb.; Creole, \$4.15 per white bag.

SWEET POTATOS—Barbados, \$1.20 per bag; \$1.44 per barrel.

TANNIAS—\$2.04 per barrel.

YAMS—White, \$1.80 per bag.

SUGAR—Dark Crystals, \$3.17½ to \$3.30; Yellow, \$4.00 to \$4.25; White, \$4.75 to \$5.00; Molasses, \$3.00 to \$3.25 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—January 26, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary \$12.00; Estates, \$12.10 to \$12.25;

Venezuelan, \$12.10 to \$12.25 per fanega (110 lb.).

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 8c. to 9c. per lb.

COPRA—\$3.15 to \$3.25 per 100 lb.

ONIONS—Stringed Madeira, \$3.50 to \$4.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.20 to \$1.25 per 100 lb.

RICE—Yellow, \$4.30 to \$4.40; White Table, \$4.60 to \$5.75 per bag.

SUGAR—Yellow crystals, \$4.00; bright molasses sugars, \$3.00 per 100 lb.

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Agricultural Banks.

AT the recent West Indian Agricultural Conference at Trinidad the Hon. Wm. Fawcett, Director of Public Gardens in Jamaica, read a valuable paper on Agricultural Banks in which he advocated the establishment of co-opera-

tive loan banks on the plan of the 'Raiffeisen' system which has given such satisfactory results within recent years in Germany and Central Europe.

For some time past—but more especially since the hurricane of 1903—the establishment of agricultural banks of some kind has been advocated in Jamaica. As mentioned by Mr. Olivier in his *Annual Report* on Jamaica for 1903-4, the condition of the peasant proprietors whose land had been devastated by the hurricane brought into prominence the necessity of some provision being made to meet further emergencies. The situation that arose through the destruction of the banana crop gave rise to a suggestion, communicated through the Secretary of State, that a scheme for insuring the banana crop might possibly be established under the direction of the Government. This suggestion was referred to a committee of the Board of Agriculture, and submitted for the opinion of the planting community, and having been reported upon as not feasible, proposals were put forward for the establishment of Agricultural Loan Banks. It was submitted that the experience gained by the Government in connexion with the organization of Government loans under the 'Hurricane Loans Law, 1903,' seemed to encourage a trial of such a scheme.

As the success of the working of the law above referred to has been mainly responsible for the urgent advocacy of the establishment of Loan Banks, it may be of interest to review briefly its principal provisions. It authorized the Government to make loans to persons in possession of land the cultivation on which had

sustained damage by the hurricane, the borrower granting to the Government a preferential claim upon the crops, a claim upon the land, and a power to sell the borrower's interest in the land if default should be made in the final repayment of the loan with interest. The borrower undertook: (a) to use the loan solely to restore, preserve, and maintain the cultivation of the land; (b) to repay the loan with 6 per cent. interest and all expenses incurred; and (c) to produce accounts showing how the loan had been expended. The borrower also had to allow inspection of the land by the Government agents, to uphold the cultivation of the land and see that the security did not deteriorate in value, and to furnish full information as to the sales of produce and to give an order on the purchaser for purchase money to be applied to repayment.

The Colonial Secretary, the Auditor General, and the Secretary of the Board of Supervision of Poor Relief were appointed loan officers: they received valuable assistance from local committees whose personal knowledge of the applicants for loans enabled the expenditure of the loans to be kept under observation.

Among the conditions under which loans were granted were: (1) no loans were to be granted where the area actually under cultivation was below 3 acres in extent unless the applicant was compelled to obtain assistance in working his land; (2) no more than £3 an acre was to be lent in any case; (3) the loans to be advanced in seven monthly instalments; (4) the rate of interest to be 6 per cent. per annum; (5) the loans to be repaid in definite instalments by certain dates during the year 1905. There were 2,983 applications for loans, the total number granted being 1,477. Practically the whole of the applications were for money to reinstate banana cultivation.

In expressing a strong opinion in favour of the suggestion that a permanent scheme of a similar character deserved the careful consideration of the Government, Mr. Olivier states: 'A government officer, personally well qualified to direct and supervise its development, would not find it an impossible task to build up an agricultural banking organization on a sound basis. The small holdings of the peasantry are generally good security for loans, but great vigilance and continual pressure would, no doubt, be required to collect the income of the bank, and the success or failure of such an enterprise would depend largely upon the acumen and energy of the manager.' He goes on to refer to the Raiffeisen system of mutual credit banks and to point out that the safeguard of invest-

ment is the honesty and industry of the borrowers and the vigilance and interest of their neighbours. To establish a similar system in Jamaica would require 'a large amount of persistent missionary effort.'

We propose in the next issue of the *Agricultural News* to give a brief account of the Raiffeisen system. Mr. Fawcett's paper will be published in due course in the proceedings of the Conference in the *West Indian Bulletin*, but with the view to placing full information on the subject of Agricultural Banks, generally, in the hands of all classes of the community at an early date, it has been decided to publish it, together with other available information, in one of the pamphlet series issued by the Imperial Department of Agriculture.

SUGAR INDUSTRY.

Hawaii.

An article in the latest issue of the *West Indian Bulletin* contains detailed information in relation to the Sugar Industry in Hawaii. In view of the somewhat extravagant statements that are made as to the profits of sugar-cane cultivation in the Hawaiian Islands, the following brief summary is likely to be of interest:—

The cultivation of sugar-cane and the manufacture of sugar are without doubt more carefully studied and carried out in a more systematic manner in the Hawaiian Islands than in any other part of the world. The irrigated lowlands produce the largest crops, for the simple reason that by the regularity of the application of water the growth of the cane is a sturdy one and never suffers from dry spells. The mean average yield of all plantations since 1895 has been 4.23 short tons per acre. It must be borne in mind that from eighteen to twenty-four months elapse from the time the land is broken until the harvesting is concluded. Moreover, the fields cannot be continuously cropped, but must be allowed to lie fallow from time to time, and about three times the area is needed to maintain continuous yields than is required to produce an annual crop. The cost of labour is high. The average cost of production of sugar on sixteen representative plantations for the crop 1901-2 was found to be \$49.00 per ton of sugar at the mill; marketing expenses were from \$11.50 to \$15.00 per ton, according to location.

In the whole territory there were 65,687 acres of land planted in sugar-cane in 1899, and from this land there were produced 2,239,376 tons of sugar-cane, or a shade over 34 tons per acre. To produce this there were expended 60c. per ton of cane produced for fertilizers. The cost of raising sugar-cane and delivering it to the factory is placed at \$4.30 per ton.

The methods of tilling the soil are varied. On some islands steam-ploughs are chiefly used. The capacity of steam-ploughs ranges from 10 to 15 acres per day, ploughing a depth of 1 foot to 2 feet according to requirements. In districts with light soils where animals are used for ploughing, the old style of hand-ploughs is fast being replaced by the latest designs of 'Sulky' or 'Disc' ploughs. Several designs of harrow are now in use for the tilth of the soils before furrowing, but the 'Spike' or 'Drag' harrow is more

generally used than any other. The land is furrowed, on an average, about 5 feet apart.

The general method of planting is to place the seed in the furrow by hand, butt to butt, and covered to a depth of from 2 to 3 inches. It is considered that, wherever it is practicable, cultivation between the rows should be done with cultivators drawn by mules. In the matter of 'hilling up' there appears to be considerable difference of practice: no doubt this is due largely to difference in climatic conditions.

Very careful attention appears to be paid to the manurial requirements. On some plantations a most commendable system is followed of modifying the composition of fertilizers to suit the requirements of different fields. One planter states: 'Our regular plant cane mixture is composed of superphosphate, sulphate of potash, nitrate of soda, and sulphate of ammonia. We have each field we plant analysed, and vary the proportions of the above ingredients to suit the analysis, so that, as a rule, every field has a different fertilizer to suit its requirements.'

Sugar can be produced at a profit in Hawaii only when cultivated and manufactured on a large scale. More than two-thirds of the cane grown in Hawaii is produced by artificial irrigation, and the water for this purpose can be obtained only from surface streams or by pumping from subterranean sources. Owing to the nature of the formation of the islands, ditches of many miles in length are required, as well as dams and reservoirs to impound the water. This entails enormous expense. Undoubtedly, however, the soil is productive, and the yield is comparatively large on most of the plantations.

Mexico.

According to a correspondent of the *Louisiana Planter*, Mr. Parsons the American Consul-General in the City of Mexico is undertaking an investigation of agriculture in tropical Mexico. This trip is stated to be the direct result of a report furnished to Washington more than a year ago in which the condition of agricultural industries was adversely reported upon. The following is an extract from the letter referred to:—

It is a fact that the sugar industry in southern Mexico is in a flourishing condition, and the sugar growers intend to make this fact plain to Mr. Parsons. Cane in tropical Mexico reaches full maturity, having an entire year's growth, and requires no fertilizing and no cultivating to produce at least 25 tons to the acre. It has been demonstrated that by cultivation alone an average of 40 tons per acre can be easily produced. The soil and climatic conditions of tropical Mexico are ideal for sugar growing, and given energetic and capable management, adequate transportation facilities, and a modern sugar house, preserving the by-products by the aid of improved economical devices, few safer investments can be found than sugar in that section of Mexico. It is believed that Mr. Parsons' report will bring these facts to general public notice in the United States, and result in the investment of much additional American capital in sugar lands in the tropics.

The sugar situation in Mexico at the present time is brighter than for some time past, and the sugar planters, in expectation of steadily increasing demand and good prices, are planning many improvements and additions to sugar plants.

The most improved sugar machinery in Mexico is to be found in the little state of Morelos, where the greater part of the sugar manufactured is produced in accordance with scientific principles.

EXTRACTION OF PARA RUBBER.

In the *Agricultural News* (Vol. II, p. 265) brief mention was made of a new tool for extracting Para rubber which had given good results in Ceylon: Mr. W. H. Johnson in his new work, *The Cultivation and Preparation of Para Rubber*, which is reviewed on p. of this issue of the *Agricultural News*, quotes the following specification of the patent taken out for this instrument, and as this gives a detailed description it is reproduced here for general interest:—

It is well known that India-rubber is the exudation of a tree, and is usually obtained by 'tapping' or 'bleeding' the tree by making slits, grooves, or cuts in the bark, generally in a slanting condition. As the gum exudes from the tree and flows down to the lower end of each incision, it is received into a small can or other vessel attached to the tree for that purpose.

It is most important that the 'tapping' or 'bleeding' operation should be carefully and properly performed, or the health and producing properties of the tree might be affected, or the tree might be killed. For example, the depth of the slits, grooves, or cuts should not be excessive, and the lower ends of two adjacent incisions should not meet or intersect, but should be stopped short before forming a complete V at the point of attachment of the collecting can or other vessel.

The implement forming the subject of this present invention enables the 'tapping' or 'bleeding' operation to be performed with facility and expedition without endangering the life or health of the tree.

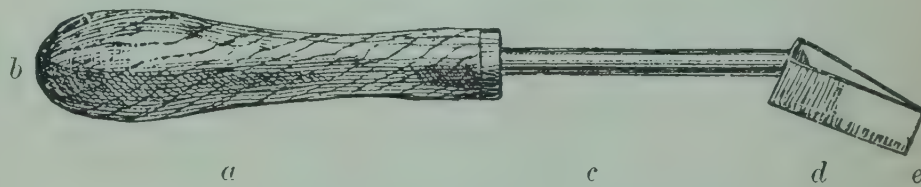


FIG. 2. Tool for incising Rubber Tree.

In the accompanying drawing Fig. 2 illustrates the implement in side elevation; *a* is a wooden or other handle of suitable size and shape, preferably furnished at one end with a stabbing or piercing point *b** for the purpose of making an initial incision in the bark of the tree before employing the cutting device which is mounted in the other end of the handle *a*, and consists of a haft or stem *c* preferably of a curved shape, its cutting end standing at an angle to the haft or stem *c*. The cutting device proper is of a hollow wedge or triangular shape as shown, the cutting edge being at *d* and *e*.

It has been found that this implement may be placed in the hands of natives and unskilled labourers with much less danger of the trees being damaged or killed than when knives or cutters of other known shapes are employed.

It is obvious that the above-described implement is also applicable for 'tapping' or 'bleeding' other trees than those yielding India-rubber.

It may be mentioned that this instrument has been proved at the Botanic Station at Dominica to be well suited also to the tapping of the Central American rubber tree (*Castilloa elastica*).

For a detailed account of the extraction and preparation of rubber readers are referred to an article in the *West Indian Bulletin*, Vol. V, pp. 210-23.

* The above figure does not show this piercing point, but its position is indicated at *b*. [Ed. A.N.]



WEST INDIAN FRUIT.

STERILIZED FRUIT.

At the meeting of the Board of Agriculture held on Tuesday, December 13, the Director of Public Gardens submitted eight jars of fruit preserved by a simple process of sterilizing. This process is as follows:—Water is sterilized by heating to 150° F., allowed to cool and next day the fruit is put into the bottles, the caps and clips are fixed on, and the bottles with the sterilized water are heated to 150° or 155° for four hours.

The total cost of the small apparatus by which this experiment was done, including freight, is £2 5s. 5d.

The bottles supplied with covers and rubber rings cost as follows:—

29 oz. size, 4s. 6d. per dozen, 48s. per gross.

20 oz. size, 4s. per dozen, 42s. per gross.

Fruits are put up in exactly the same manner in Great Britain and sold at the following prices: blackberries, 11s. per doz.; red currants, 12s. per doz.; plums, 10s. per doz. The best dessert fruits put up the same way, such as apricots, sell at 15s.; pears at 13s.; pine-apples, 11s. 6d. The fruits put up are as follows: varieties of mango, pine-apples, banana, and akee, and one of the jars being opened three months after being put up, the fruit was found to be in perfect condition. This bottled fruit is now on show at the rooms of the Agricultural Society, and we shall be glad to have anyone interested call and see it. The whole apparatus together with bottles may be had from Messrs. Fowler E. Lee & Co., Maidstone, Kent, England. (*Journal of the Jamaica Agricultural Society*, January 1905.)

WEST INDIAN FRUIT TRADE.

In an interesting article in the *Journal of the Society of Arts* on the 'Foreign Fruit Industry' it is shown that Great Britain's fruit demands are largely supplied by foreigners. Much more might be done in this connexion, it is argued, by the colonies—especially Australia, Canada, and the West Indies. 'A brave attempt is being made to create a large fruit trade between the United Kingdom and the West Indies... yet the fruit exports increase very slowly, if Jamaica is excepted. And even in Jamaica the industry does not rest on a solid basis... the planters do not concern themselves with the taste of the market, they neglect grading, and are careless as to the condition in which the fruit reaches the consumer.'

The writer urges that with both bananas and oranges Jamaica might learn much by studying the

methods of the Canaries and Spain, whose fruit usually obtains a much higher price, and states:—

And what is true of Jamaica is equally true of other West India Islands. The pine-apple, for example, flourishes everywhere, and some of the pines, the Montserrat for instance, are of very delicate flavour. But this pine is unsightly and not suitable for the English market. The best for this trade is the Smooth Cayenne, grown so largely in the Azores, and now beginning to be grown in the West Indies. It has, too, to be remembered that the pine is grown for ornament as well as quality. The crown of the pine is the glory of it, and it is found that the wind and weather to which it is subject in the West Indies injure its appearance, a drawback that might easily be overcome by the erection of some sort of inexpensive sheltering. But nothing is done. Just as the English farmer thinks all that is necessary, to make a paying orchard, is to plant a certain number of apple trees without much regard to adaptation of kind to soil, and to pack them when ripe, and send them anyhow to market, so the West Indian grower pays little attention to quality. But it is quality, as Mr. Monro, of King Street, Covent Garden, is never tired of insisting—and he is one of the biggest fruit-brokers in the kingdom—that is the one thing indispensable in fruits that are to secure any hold on public consumption.

BARBADOS BANANA INDUSTRY.

The following notes on the banana industry of Barbados are extracted from an article in the *Western Morning News* of January 19:—

But if the Canary banana so far has surpassed the Jamaica fruit in appearance, it has now a competitor to face which is more than equal to it in quality. The Barbados banana can now be put upon the English markets in perfect condition. It has taken time to market the Barbados banana in perfect condition in this country. The loss sustained does not exceed 1 per cent., so that the shipping arrangements must be considered admirable.

The planters in the colony are wise in their rejection of the larger-growing variety raised in Jamaica. It is known as the Gros Michel. It deserves the prefix Gros on account of the size of its bunches, but is a coarse kind, and not to be compared to the delicate but fine fruiting kind shipped from Barbados. But though the latter is the same sort as that raised in the Canaries, yet the fruits produced are far richer and better flavoured than those of the Canaries. At present the Barbados is the finest fruit of its class imported into the United Kingdom.

COTTON INDUSTRY.

Sea Island Cotton Market.

The following is extracted from the latest report, dated January 28, received from Messrs. H. W. Frost & Co., of Charleston and Savannah, in regard to the Sea Island cotton market:—

The demand this week was limited to old bags classing fine and fully fine at 21c. to 23c., and tinged islands 20c., the buying being principally for England. The factors are unwilling sellers at the decline quoted, and consequently the sales were small. The unsold stock of 3,395 bags consists very largely of planters' crop lots classing fully fine to extra fine for which there is no inquiry at present, with the exception of 40 bags Lofton, sold for France at 28c.

Factors are still refusing to entertain any bid for the crop lots below 28c. to 30c., but should no demand spring up they will have to modify their views in time.

We quote: stained and tinged, 17c. to 20c.; fine, 21c.; fully fine, 23c. to 24c.; extra fine, 27c. to 28c.; extra-fine crop lots, 28c. to 30c.; extra-extra-fine crop lots at 48c.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop:—

Mr. F. R. Shepherd (St. Kitt's) writes: 'The bulk of the cotton has now been picked, only the late-planted fields remaining. Spooner's Ginning Factory has ginned some 26,000 lb. of lint, and the Stone Fort Factory is also making a good start. Pump Bay Factory has been tried and will, I hope, soon be in working order. At one estate the 16 acres, planted entirely with Rivers' seed, are giving a splendid return, and the cotton is remarkably clean and well picked. The leaf-blister mite is not as troublesome as it was at this time last year, but I have strongly urged all growers to pull up the old trees and burn them at once.'

From St. Vincent Mr. Sands reports: 'At the factory 83 bales of seed-cotton have been ginned up to February 8, and by the day the mail leaves there will have been delivered for shipment 95 to 98 bales, each containing 360 lb. of lint. The disintegrator for grinding cotton seed has arrived and will be erected at an early date. The cotton so far dealt with appears to be well prepared and of good quality.'

Barbados.

The following report on the cotton industry in Barbados for the fortnight ended February 22, has been forwarded by Mr. J. R. Bovell, F.L.S., F.C.S.:—

I am glad to be able again to report that the cotton all over the island is, with few exceptions, practically free from insect pests.

A large quantity of the cotton has already been picked, some of which has been sent to the Cotton Central Factory, the remainder being sent to Mr. H. E. Thorne's Factory.

Owing to the long drought that occurred during November and December, the yield of the cotton planted late will, I regret to say, be not as much as was hoped. Some of the planters of the early cotton got as much as 1,000 lb. of seed-cotton per acre; those who planted in September and October are getting practically only half that quantity.

Up to the 21st. inst. the Cotton Factory had ginned

196,872 lb. of seed-cotton, yielding 54,483 lb. of lint. This lint has been made into 142 bales, of which 59 have been shipped, as follows: 24 bales by the S.S. 'Orinoco' on January 14, and 35 bales by the S.S. 'Trent' on January 28, and 75 bales are being shipped by the S.S. 'Rosetti' to day.

I may mention that I had intended sending 55 of these bales by the S.S. 'LaPlata' which left here on Saturday February 11, but at the last minute it was found that there was no room for them. As the 'Rosetti' is the first available opportunity, I am sending them by this ship, along with 20 bales of cotton ginned during last week and this week.

Hayti.

The *Textile Mercury* of January 21 has the following note on cotton in Hayti:—

In a report on cotton growing in Hayti, the United States Consul at Port-au-Prince writes that the high prices obtained for cotton last year offered great inducement to the planters to cultivate this product on a more extensive scale. No doubt cotton would have become a great factor in the exports, and would have greatly added to the revenue of this country, but for the great disturbance in Haytian finances, which caused a rapid increase of all expenses and thus compelled the planters to reduce their planting. While there has been considerable increase over former crops, the improvement will not be as great as was expected. This country is very suitable for the growing of cotton, and a large quantity could, no doubt, be produced at a larger profit than in the United States. Haytian cotton once planted continues to produce for twenty years without replanting, and requires but little care or cultivation. The only expense is the gathering, ginning, and baling. The staple is of good quality. Sea Island cotton has to some extent been introduced with success, and the planting is increasing, as it has proved to be very profitable. This cotton, once planted, will produce four crops before the plant dies out.

DESTRUCTION OF RATS AND MICE.

Reference was made in the *Agricultural News* (Vol. III, p. 299) to the successful use in France of cultures of pathogenic bacteria for destroying rats and mice in districts where great losses had resulted from their depredations on vines and growing crops.

Messrs. Evans, Sons, Lescher, and Webb, Ltd., of Liverpool, advertise in the *Pharmaceutical Journal* as the sole agents for the 'Liverpool' virus, for the destruction of rats and mice, prepared by the Incorporated Liverpool Institute of Comparative Pathology (Serum Department). The following information is supplied:—

The virus is *not* a poison, but is destructive to rats and mice, amongst which it causes in a few days a contagious disease. Rats, when infected with the disease, come out of their holes seeking air and light. Others leave their haunts immediately on the outbreak of the disease.

It is suggested that this virus might be usefully employed in the West Indies where rats and mice are particularly destructive to growing crops and stored produce. With a view to testing its efficiency, a supply of these cultures is being obtained by the Imperial Department of Agriculture for experimental purposes.



WEST INDIAN FISHERIES.

The following are extracts from the *Annual Reports* on the West Indian Colonies for 1903 in which references are made to the fisheries:—

BAHAMAS.

The marine industries include the catching of turtle, both of the edible species and of the species which affords the turtle, or tortoise, shell of commerce.

An interesting venture in hatching turtle eggs and breeding young turtle is now being carried on at Inagua, concerning which the Resident Justice reports as follows:—

'The turtle industry is in a flourishing condition. The mouth of the creek has been fenced across, and nurseries made for young turtle. Large quantities of turtle eggs have been gathered and stored in barrels of sand for hatching. The hatching process takes six weeks. Several hundreds of young turtle have thus far been hatched and placed in nurseries where they are fed on conchs for a week or two until old enough to search for food on their own account.'

Some alarm has been felt at the condition of this and the sponge industry, and a Board has been constituted to investigate the present condition of the sponge beds and turtle fisheries and recommend to the Government such measures as may appear necessary and feasible for the prevention of the exhaustion of the sponge beds and for keeping up the stock of turtle.

BARBADOS.

Another industry which has been fostered by the Imperial Department of Agriculture is the curing for export of flying fish, albacore, and the various other fish that abound in these waters. The experiments made have gone to show that the fish, both pickled and dry-salted, can be exported and sold at a fair profit in the neighbouring colonies, and there is no reason to doubt that it will also find a sale here at times when the fresh fish is not obtainable.

BRITISH GUIANA.

There is an abundance of fish in the waters of the colony, but as an industrial pursuit fishing is comparatively neglected, though several small fish-curing enterprises have lately been taken up. The deep-sea fishing, established some years ago for the supply of the local market, has been maintained, and Georgetown is well supplied with grouper, dolphin, red snapper, etc. The Fisheries Commission, appointed by the Royal Agricultural and Commercial Society in 1901, is still collecting information with regard to the habits, breeding seasons, etc., of the fishes of the colony. *

GRENADA.

Fish is caught only on the coasts for daily consumption. Whales and turtle abound in their seasons, and Carriacou is

* In reference to the fisheries of British Guiana we may mention that a little book on the *Fishes of British Guiana* has recently been published containing interesting and useful notes on river and sea fish in that colony. It is written by Mr. T. Sidney Hargreaves, F.G.S., and is published by the Argosy Co., Ltd. A brief review of it will be found in the *Agricultural News*, Vol. IV, p. 11. [Ed. A.N.]

noted for a fine oyster which grows on the mangroves in a large, land-locked harbour there.

ST. LUCIA.

A fairly large number of boats is engaged in fishing around the coast of the island, but solely for the purpose of supplying the local market, and no attempt is made at preserving for export purposes.

WEIGHT AND VALUE OF EGGS.

A correspondent writes in the *Barbados Advocate* of February 11 as follows:—

It is most extraordinary that the variety in the weight and value of eggs as an article of merchandise should have been so universally overlooked. So far as is known, it has always been the custom everywhere to sell eggs by number, without respect to size, weight, or peculiar quality, yet no absurdity can be greater. It has been ascertained by careful experiments recently made, that the fair average weight for a dozen eggs is 22½ oz. It appears that the largest eggs weigh 24 oz. per dozen, and the smallest only 14½ oz. In the one case a fraction over eleven eggs would equal the average weight of a dozen, and in the other it would require over eighteen eggs to reach the proper weight; thus the difference in weight between the two kinds is about one-half, while the price is the same.

It may be mentioned that the way to improve the size and quality of eggs is to select carefully the best stock for breeding purposes, and also to give special attention to the feeding of poultry. Full information in this connexion will be found in Pamphlet No. 23, *Notes on Poultry in the West Indies*. A feature of this pamphlet is that preference is given to native food-stuffs.

A note on this subject in the *Natal Agricultural Journal* has the following:—

Primitive simplicity characterizes colonial dealings in poultry and eggs. A fowl is a fowl with many colonists, and so is an egg an egg. A correspondent writes:—

'I recently bought from a leading Maritzburg grocer a dozen of eggs, for which I paid 2s. On returning home I weighed them against a dozen of eggs, laid by my Orpington fowls. These eggs weighed just twice as much as my shop ones. Still I do not think people will buy them at 4s. per dozen.'

Most probably not. A considerable member of the town burgers are thrifty housewives, who find small eggs fried or boiled serve as well as large ones. In general cooking, however—and eggs come into nearly every good recipe—a big egg, such as that of the Orpington, may be counted as two, and this immense superiority in quantity should meet with proper recognition.

Grenada's Motto.—'Clarior e tenebris.' This motto faithfully describes the fortunes of the colony, which after much suffering entailed by the decadence of the sugar industry, has emerged from her troubles more prosperous than ever before. The high tide of prosperity still continues, but, with a rapidly increasing population, and with the greater portion of the land of the island absorbed by permanent cultivation of products, which are bound to be subject in the future to some vicissitudes, it cannot be said that the sky is free from clouds. (*Annual Report* for 1903.)

SCIENCE NOTES.

Seed Infection.

The following note, from *Science* for February 12, 1904, on a fungoid disease of beans is of interest as showing the danger of disseminating diseases by means of infected seed:—

The bean crop in the vicinity of St. Louis was severely injured this year in many instances by *Rhizoctonia* sp., which not only attacked the stems and larger roots of the plants, but also produced brown, sunken areas on the surface of the pods, penetrating the latter and discolouring the seeds. An examination of a number of seeds whose surface was discoloured disclosed the fact that the mycelium of the fungus had established itself in the seed-coat and in many instances had formed minute sclerotia there without rotting the seed or even penetrating the cotyledons. Pure cultures of *Rhizoctonia* were easily obtained from a number of mature discoloured beans which had been carefully removed from diseased pods. The presence of the fungus does not prevent the germination of the seed, as was proved by a test. From this it follows that a very common means of disseminating *Rhizoctonia* on the bean is through diseased seed, and that seedsmen should be careful not to send out discoloured beans.

It is well known that several fungoid diseases are disseminated by spores attached to the seeds of their hosts. The smut and bunt of cereals (wheat, oats, etc.,) are classical examples of this; these diseases are now dealt with by treating seed for planting with formalin, copper sulphate, corrosive sublimate, or hot water, to kill the fungus spores. 'Seed' potatoes affected with scab are treated with formalin or corrosive sublimate. The cotton seed imported by the Imperial Department of Agriculture from America was treated with corrosive sublimate solution with the object of preventing the introduction of fungus spores that might be attached to the seed.

A New Sugar Plant.

Some four years ago, Dr. Bertoni, Director of the Agricultural College at Ascuncion, Paraguay, discovered a new sugar-yielding plant, locally known as *Cad-éhé* (meaning 'sweet herb') whose secret had for a long time been known to, and jealously guarded by, the Indians of that district. Leaves of this plant were forwarded by H. B. M. Consul at Ascuncion to the Royal Gardens, Kew, and a description of the plant was subsequently published in the *Kew Bulletin* (1901, pp. 173-4).

At the request of the Imperial Commissioner of Agriculture, H. B. M. Consul at Ascuncion was asked to obtain seeds and leaves of this plant for shipment to Barbados. The following is the Consul's reply, dated November 22, 1904, to the Secretary of State for Foreign Affairs:—

I have the honour to acknowledge the receipt your Lordship's despatch, No. 6, Commercial, of the 7th. ultimo, enclosing a despatch from His Majesty's Minister at Rio, relative to the *Eupatorium Rebandianum*.

This plant was discovered by Dr. Bertoni near the Brazilian frontier some 250 miles from here and not, as the

official journal of Rio states, near Ascuncion. Its local Guarani name is *Cad-éhé*, which means sweet herb.

On learning of its existence in 1901, I managed with some difficulty to procure and press a specimen which I forwarded to the Director of the Royal Gardens at Kew, and a description of the plant was then published in the *Kew Bulletin*.

The *Cad-éhé* is said to grow freely in certain parts of Paraguay and also, I am informed, in the interior of the Brazilian State of Matto Grosso, but owing to the inaccessibility of these regions, specimens are not easily obtained.

I will, however, endeavour to carry out your Lordship's instructions and forward some pressed leaves and seeds to the Imperial Commissioner of Agriculture at Barbados.

Alkaloids in Thorn Apple Seeds.

In connexion with the note in the *Agricultural News* (Vol. III, p. 358) on the thorn apple (*Datura Stramonium*), it may be of interest to mention that the seeds of this plant have recently been the subject of an investigation in the Scientific and Technical Department of the Imperial Institute, an account of which is given in the *Bulletin of the Imperial Institute* (Vol. II, no. 4).

'A sample of *Datura Stramonium* grown in Egypt was also found to contain hyoscyamine [the principal alkaloid in the belladonna plant and also the henbane (*Hyoscyamus niger*)] with only a trace of other alkaloid, and it was therefore desired to ascertain whether the plant obtained from India would give a similar result, and what proportion of alkaloid would be present in this case.'

The investigation of a sample of seed obtained from India showed that these seeds resembled the Egyptian seeds in the fact that practically the whole of the alkaloid is present as hyoscyamine, but the Indian seeds contained a smaller proportion of alkaloid.

'The nature of the alkaloid present in the seeds of *Datura Stramonium* appears, therefore, to be quite constant, whatever the country of origin may be, but whereas the Egyptian seeds were found to contain as much alkaloid as European seeds, the sample from India yielded a lower proportion.'

WATER BUFFALOS.

The Jamaica Board of Agriculture is endeavouring to obtain information on the subject of Water Buffalos. The following is an extract from the official report of a meeting of the Board on November 15, 1904:—

The Secretary read replies to his inquiries regarding the Water Buffalos—(1) from the U. S. Department of Agriculture, with the information that the water buffalos were not in use in the United States, but were being used in the Hawaiian Islands on account of their value for work in wet and mud, in the cultivation of the rice fields; (2) from Mr. Meaden, Manager of the Government Stock Farm, Trinidad, giving particulars as to their use in Trinidad and their cost, and giving reference to the Hon. S. Henderson, Chaquanas, Trinidad, and Mr. L. Bert de Lamarre, Orange Grove, Trinidad, who had herds of buffalos. The Secretary was instructed to write these gentlemen for full information as to these animals and as to whether they could be procured in Trinidad, and their cost.

It may be mentioned that the Representatives at the recent Agricultural Conference in Trinidad were afforded an opportunity of seeing the water buffalos belonging to the Hon. S. Henderson, at Chaquanas, and were much interested in them.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 63 of this issue.

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Agricultural News

VOL. IV. SATURDAY, FEBRUARY 25, 1905. No. 75.

NOTES AND COMMENTS.

Contents of Present Issue.

In the editorial on Agricultural Banks on pp. 49-50 of this issue an account is given of the working of the Jamaica Hurricane Loans Law, 1903, the success of which has been mainly responsible for the advocacy of the establishment of Loan Banks.

The notes on the sugar industry deal with cane cultivation in Hawaii and in Mexico. The former note is a brief summary of information collected for an article in the *West Indian Bulletin*, Vol. V, no. 3.

On p. 51 there will also be found a detailed description of a tool for incising rubber trees to which reference has previously been made in the publications of this Department.

Interesting articles on the prospects of the West Indian fruit trade will be found on p. 52; also a note on sterilizing fruit which contains useful information.

Notes on the Sea Island cotton market and on the prospects of the present crop in the West Indies are published on p. 53.

Under 'Insect Notes' further information is given as to the strength of hardbacks; also a note on the classification of moths and butterflies.

Objections have been made, from time to time, to the prominence that is being given to agricultural teaching in elementary schools. As a reply to such objections, we publish the report of a recent address by the Archbishop of the West Indies on this subject (see p. 59).

Agriculture and Fisheries.

On p. 54 of this issue there will be found extracts from Colonial Office Reports on the fisheries of the West Indies. It may be mentioned that the organization of fisheries is now regarded as coming within the scope of the work of Agricultural Departments. This principle is recognized in Great Britain, in Ireland and at the Cape of Good Hope, where the Agricultural Departments conduct investigations in connexion with, and otherwise render assistance to, the development of the marine resources.

As was remarked by the Rt. Hon. the Earl of Onslow, President of the Board of Agriculture and Fisheries, at the last annual dinner of the Kew Guild, 'Agriculture is a noun of multitude, for it not only includes Horticulture but Fisheries.'

Onion Seed.

It is proposed to obtain from Teneriffe a further supply of onion seed (red and white) for planting in the West Indies. Planters who are desirous of obtaining seed are requested to inform the local officers of the Department *immediately* what quantity of seed of each variety they require.

Planters are strongly advised to sow the seed in beds and afterwards transplant the young plants to the fields. Not only is this method more economical of seed, but the young plants can be better looked after. Further it gives bigger yields than sowing directly in the fields.

This last advantage is very clearly brought out by some experiments recently conducted at the Oregon Experiment Station in the United States. The average yield of five different varieties when sown in the field was 389 bushels; when transplanted the average yield was 655 bushels, or an average increase of 266 bushels (68 per cent.) due to transplanting.

Trade of Trinidad.

In the *Annual Report* on Trinidad for 1903-4 it is stated that the exports of produce from the colony show an increase of £41,940 over those of last year, 'and that in spite of the fact that one picking of cacao failed almost entirely during the year under review.'

The exports of sugar, which were 7,000 tons less than during 1902-3, were the smallest output for many years, but, owing to the recovery in prices, gave an increased value of £25,900 as compared with those of the previous year.

For the reason already given in the exports of cacao there was a deficit of 15,778 cwt. This would have been much greater had it not been that the later picking was so good. The exports of asphalt amounted to 192,220 tons, being 33,120 tons in excess of the output for the previous year. The value was £204,126.

We notice that this report does not contain a section for agriculture, as is to be found in most of the other reports of this series. Consequently, no reference is made to the useful work carried on by the Botanical Department.

Permanent Exhibition Committees.

In the *Agricultural News*, Vol. IV, p. 20, brief mention was made of the suggestion of the Secretary of the West India Committee that in all the West India Islands permanent exhibition committees should be appointed with the view to securing adequate representation at all exhibitions in Great Britain. In the *West India Committee Circular* of January 3, this suggestion is referred to as follows:—

‘That each island should appoint a *permanent* Exhibition Committee, consisting of, say, six members, and comprising representatives of the local West India Committees, the Agricultural and Commercial bodies, and the Government, who might undertake the arrangements for all the exhibitions and thus obviate the necessity of appointing a fresh committee to deal with each case as it arises.’

A correspondent commenting on this in the *West India Committee Circular*, makes the further suggestion that, following the example of Canada which has a permanent court at the Crystal Palace, arrangements might be made for some permanent exhibit from which supplies could be drawn for provincial shows.

We consider that these suggestions are worthy of careful consideration in the various islands; possibly the Agricultural Societies might discuss them with a view of carrying them out if they are considered feasible.

Fruiting of the Travellers' Tree.

In a note in the *Agricultural News* (Vol. II, p. 412) it was mentioned that a specimen of the ‘Travellers’ Tree’ (*Ravenala madagascariensis*) had fruited in Borneo and that this was the only record of the fruiting of this plant in the East. In response to a suggestion that records of its fruiting in the West Indies would be of interest, several correspondents forwarded notes which have been published from time to time in the *Agricultural News*. It may be of interest to bring together these records.

Mr. Dopwell wrote that one of these trees fruited at the St. Vincent Botanic Station in 1901, a few plants being raised from the seeds produced. The same tree fruited again in the following year, and a few plants were again raised from seed. (See Vol. III, p. 12.) A further note, by Mr. Henry Powell, formerly Curator of the Botanic Station at St. Vincent, in relation to this tree will be found in Vol. III, p. 342.

From Jamaica Mr. Fawcett wrote that a tree at Castleton Gardens had fruited regularly for over twenty years, seeds having been gathered for propagation purposes and for distribution. (See Vol. III, p. 60.)

Mr. Hart was not aware of any plants having fruited in the Botanic Gardens at Trinidad. He mentioned, however, several instances of the flowering of plants that had been raised in the Gardens. (See p. 40.)

In the last issue of the *Agricultural News* (p. 44) we recorded that an old specimen of this tree was fruiting in St. Kitt’s, where fertile seed had previously been produced.

Carriacou Land Settlement Scheme.

In reference to the note in the *Agricultural News* (Vol. IV, p. 29) relative to the Land Settlement Scheme in Carriacou, the following particulars contained in the recently issued *Annual Report* on Grenada for 1903 may be of interest:—

Two estates had, so far, been purchased and cut up into allotments, giving 244 saleable agricultural lots and fifty-one building lots for the extension of the town. Of the former all but twenty-five had been sold.

It is considered that this scheme is likely to cause an appreciable increase in the quantity of cotton exported from the island.

It is stated that, apart from the benefit derived from the settlement of a valuable class of proprietors on land hitherto unprofitable, important property had accrued to the Government from the acquisition of the estates. ‘It may, therefore, be claimed that, so far at all events, the scheme has been a complete success, and with it a new era has opened for Carriacou.’

Rubber in West Africa.

A Report on ‘Rubber in the Gold Coast and Sierra Leone’ by Mr. W. H. Johnson, F.L.S., Director of Agriculture, Gold Coast, has been issued as a Colonial Office Report (Miscellaneous, no. 28, 1904). The special object of this publication is to disseminate information as to the rubber plants best adapted to cultivation in those colonies with a view to preventing the extermination of the rubber industry.

It is obvious that some measures must be taken if this is to be prevented, for it is undoubtedly in consequence of destructive methods of tapping that the value of the exports of rubber from the Gold Coast has declined in five years from £555,731 in 1899 to £196,500 in 1903.

In this report, then, Mr. Johnson discusses the merits and demerits of six rubber plants which are generally accepted as the most valuable, viz., Para (*Hevea brasiliensis*), West African (*Funtumia elastica*), Central American (*Castilloa elastica*), Ceara (*Manihot Glaziovii*), Assam (*Ficus elastica*), and West African (*Landolphia owariensis*). The last named having a climbing habit and being difficult to tap, it is not considered suitable for cultivation on a large scale. The yield from the Ceara and Assam trees, although the trees have made good growth, has not been sufficient to cover cost of collection. *Castilloa elastica* has proved particularly susceptible to insect attacks and does not appear to thrive in the Gold Coast.

There remain, therefore, two rubber plants which may be selected for planting. These are *Funtumia elastica* and *Hevea brasiliensis*, both of which have given satisfaction at the Botanic Gardens at Aburi. An interesting account is given of the experimental cultivation of these two plants. The latter has proved a quicker grower and appears to give a larger yield of rubber, and it is concluded that the Para rubber is the most satisfactory rubber tree to cultivate in West Africa.



INSECT NOTES.

Strength of Hardbacks.

In order to contrast more clearly the strength of these insects with the strength of larger animals, the following figures are given, based on the results of experiments (1), (2), and (3) recorded in the *Agricultural News* (Vol. II, p. 42).

In (1) the beetle dragged a load 15.43 times its own weight, in (2) it pushed a weight 141.1 times its own weight, and in (3) it carried and dragged a load 400 times its own weight. If a man weighing 150 lb. were as strong in proportion he would be able, under conditions similar to those of (1), to drag a load of over 1 ton. Similarly, with (2) he would be able to push a load of over 9 tons, and in the case of (3) to carry and drag a load of over 27 tons. If a horse weighing 1,200 lb. were as strong in proportion as the hardback, it would be able to draw in (1) 8 tons; in (2) 75 tons; and in (3) it would have to move a load, partly on the ground, of 214 tons.

Physiologists estimate that a man can draw .86 per cent. of his own weight and a horse only .67 per cent. of its weight. Therefore, a man weighing 150 lb. can draw 129 lb., and a horse of 1,200 lb. can draw 804 lb. Comparing these figures with the figures given in experiment (2), it will be seen that the beetle is about 164 times stronger than a man and about 211 times stronger than a horse, in proportion to its weight.

Moths and Butterflies.

Moths and butterflies belong to the order of insects to which has been given the name of Lepidoptera, which is derived from two Greek words meaning *scale* and *wing*, and refers to the scales with which the wings of most lepidopterous insects are covered. These scales are flattened and of many colours, giving rise to some of the most striking colour patterns and colour effects to be found in the insect world.

The metamorphosis is complete and abrupt. The larva is a caterpillar, with an elongate, more or less cylindrical, segmented body. It is provided with stout mandibles and feeds, generally, on vegetable matter. There are usually three pairs of thoracic legs and five pairs of abdominal legs. Variations occur both in the shape of the larvae and in the number of abdominal legs, and in some species the thoracic legs of the larvae are so reduced as to be scarcely distinguishable and very rarely are entirely wanting.

The division of Lepidoptera into two great series, Rhopalocera, the Butterflies, and Heterocera, the Moths, is the most commonly used. The word Rhopalocera is derived from two Greek words meaning *club* and *horn*, and refers to the clubbed antennae of the butterflies, while the word Heterocera comes from the Greek words meaning *other* and *horn* referring to various forms of antennae of the moths. Sharp* gives this classification of the Lepidoptera:—

'Series I, *Rhopalocera* or Butterflies. Antennae knobbed at the tip or thickened a little before the tip, without

pectinatus, projecting processes, or conspicuous arrangements of cilia. Hind wings without a frenulum, but with costal nervures strongly curved at the base.

'Series II, *Heterocera* or Moths. Antennae various in form, only rarely knobbed at the tip, and in such cases a frenulum present. In the large majority a frenulum is present, and the costal nervure of the hind wing is either but little arched at the base, or it has a large area between it and the front margin; but in certain families the hind wing is formed much as in the *Rhopalocera*.

'It may be inferred from these definitions that the distinction between the two sub-orders is neither sharply defined nor of great importance. The club of the antenna of the *Rhopalocera* exhibits considerable variety in form. Butterflies are as a rule diurnal in their activity and moths nocturnal; but in the tropics there are numerous *Heterocera* that are diurnal and many of these resemble butterflies not only in colour but even in the shape of their wings.'

Carpenter* says: 'The popular division of Lepidoptera into Butterflies (*Rhopalocera*) and Moths (*Heterocera*) is quite unscientific, the butterflies being more nearly related to the higher moths than these to the lower moths.' Smith† says: 'Rhopalocera are those in which the antennae or feelers terminate in a more or less distinct knob or club at the tip, and in which at least the front pair of wings is elevated or vertical when at rest so that the upper surfaces touch when at rest. The *Heterocera*, on the other hand, have feelers, or antennae, of many different kinds, but never in our fauna distinctly clubbed.' Comstock‡ makes three divisions of Lepidoptera—the moths, the skippers, and the butterflies. Most of the skippers are generally included in the butterfly series, while a few which Comstock places in this sub-order are classified among the moths by other authors.

The genus *Megathymus*, which Comstock makes the basis for the family Megathymidae of the skippers, is included by Sharp in the family Castniidae of the moths, of which family Sharp says: 'The insects of this family combine to a large extent the characters of butterflies and moths. The antennae are knobbed or hooked at the tip, there is a large precostal area to the hind wing. The nervules of the front wings are complex and anastomose so as to form one or more accessory cells.'

It will be seen from what has been said that the division of Lepidoptera into two great series or sub-orders is merely a matter of convenience, not scientific, and presents no hard and fast line of division, and there is also a question whether, if any sub-orders or series are designated, there ought not to be three divisions. Sharp says: 'The division of all Lepidoptera into two series is merely a temporary device necessitated by imperfect acquaintance with morphology'; and Carpenter says: 'On the whole, it is better not to adopt any division of the Lepidoptera between the order and the family.'

The use of the terms butterfly and moth has, however, become firmly established and will probably continue in use for some time to come, because they are so convenient in their ordinary use and application.

Fire-flies in Jamaica. The *Daily Telegraph*, February 6, 1905, has an interesting account of the Jamaica fire-flies. They are beetles (Coleoptera) of the families Elateridae and Lampyridae. The writer has proved that fire-flies do not eat mosquitos, as they have been supposed to do.

* *Insects: Their Structure and Life.*

† *Economic Entomology.*

‡ *Manual for the Study of Insects.*

* *Cambridge Natural History, Insects II, p. 340.*



THE RELATION OF TEACHERS TO AGRICULTURAL DEVELOPMENT.

The following is a report, taken from the *Gleaner* of January 18, of an address delivered to the teachers attending the recent agricultural course at Jamaica by his Grace the Archbishop of the West Indies:—

The Archbishop said the subject he was asked to speak on was the relation of teachers to the general agricultural development of the island. They would observe that he had several times before addressed the teachers attending the agricultural course on the same subject, and he supposed the reason for that was because he had so much to do with the work of the teachers in all parts of the island, and that he was able to advise on the subject in a general way. He wanted them to realize that there was nothing technical in what he was about to say. They had had a variety of subjects dealt with by teachers who were competent to deal with the technical part of the subject. What he had to do in the time at his disposal was to try and stimulate them in what they had to do in their work as teachers towards the general agricultural development of the island.

There was some misunderstanding as to the work they were trying to carry out, even hostility; but he asked them to believe that the work they were called upon to do was a great work, to remember that they came into daily contact with the boys and girls who within the next fifteen years would be the working people of the island, and pointed out that theirs was the opportunity of turning the children's attention—of implanting in their minds what would be required of them—in such a way as to have a profound effect on the working folks of Jamaica. He wanted them to get it into their minds as a settled thing that the more a workman knows the better workman he becomes, as well as a more efficient labourer of the soil. He knew a number of teachers who were setting such an example to the youths in their midst. He knew that many of the best elementary school teachers had the best grounds in their districts before these efforts were being attempted, and he hoped that this example would now be general in spite of the rules. He urged on them to remember that it was their privilege to show the community in which they dwelt what was true industry and the value that was to be put on the methods of the things of life.

He had heard the question put: Why should we trouble ourselves to introduce agriculture in our schools whilst it is not done in other countries? It was true that in England, in some of the agricultural districts, there had been little agricultural education; but it was also true that the English farmer was getting behind the rest of the world—was missing his chances of competing with other people of the world. In certain parts of France, particularly in Normandy, and in Denmark, the small farmers had learnt to apply a great many things that were taught in agriculture but which were ignored by other people, and which resulted in their being able in some things to compete with the world. Let them think what a great pity it was to have to import such a large quantity of Blue-nose and of Danish butter into this country—an agricultural country. But Jamaica people had not learnt farming yet. Jamaica people had learnt to make sugar and rum and to handle coffee, and in even that they still had something to learn. Some of their leading men

were even slow to acknowledge that there were things new to them or to learn to adopt scientific methods. And so from generation to generation the Jamaica people were ignorant of the things that go to make up the farmer. That was not their fault, and so they had still to be taught to become farmers in Jamaica. That, he thought, answered the question whether agricultural education should be taught in this country. They did not want to wait for a generation or two to learn agriculture. They wanted to go ahead and be able to compete with the rest of the world.

His Grace related a story illustrating the carelessness in the methods of grading coffee here. The practical endeavours to do agricultural work, his Grace went on, were of the highest importance, and he asked them to let no one dissuade them from the usefulness of disseminating this knowledge among the children in the schools, as the more general knowledge our people had, the more they would be able to apply it to specific subjects.

The speaker gave two apt illustrations of what was being done to injure the reputation of Jamaica fruit abroad. Travelling along any of the roads any day, it was no uncommon sight to see a cart laden with bananas, and on top of the fruit were three or four persons along with their loads. The cart driver had, either through civility or through what he believed to be christian kindness, given them a lift. The result was that when that fruit got to England the dealer who bought them would find to his cost that they were rotting, and the result was loss to him, and loss to the reputation of our fruit, as it was only natural that he would prefer to buy bananas shipped in crates. With oranges the method was to place a cart ready to receive the fruit at the side of a bank, and then the people came out one by one and, standing on the edge, dumped the fruit into the cart. The effect of such treatment was not seen until some time after the fruit arrived in England, and the effect was of course disastrous. If he (the speaker) had the money he would send a few of his hearers to see what was done abroad in the way of packing and handling fruit for the market. Only that day at the Board of Agriculture the matter was discussed, and it was suggested to have a chart and on that chart should be written in the shortest crispest way what people should do and what they should not do. For example, he would like to see among them this: 'Don't sit on the bananas.' A chart like that in every school read once a week would do an immense amount of good within five or six years.

In concluding an admirable address his Grace expressed the wish that the teachers would be encouraged to go on most heartily in the course they were pursuing, that they would be stimulated to go ahead in spite of adverse criticism and so leave their mark on the youth of their district who would bless them, and their country would also bless them.

White Sorrel. Mr. C. J. Hering, of Surinam writes, in reference to the note in the *Agricultural News* (Vol. III, p. 167) on the Red Sorrel (*Hibiscus Sabdariffa*), asking to be informed if the white (yellowish) sorrel is found in the British West Indies. He says: 'The plant resembles in all respects, except in colour of stem, leaves, and fruits, the red sorrel. The flower is the same as the red sorrel, while the jelly, marmalade, or wine made from it has a greenish-yellow colour, but the same flavour as the red one.' We are of opinion that the red variety is preferred in the West Indies and that the white, though well known, is not used to any extent. Possibly some of our readers can supply information on this point.



GLEANINGS.

The Sea Island cotton farmers are continually looking for better seed, and considerable new seed will be sold this season. (*Cotton Trade Journal* of Savannah, Ga., U.S.A.)

Mr. Elias Buckmire, Foreman of the Botanic Station at St. Lucia, has taken temporary charge of the Montserrat Stations in consequence of the transfer of Mr. Jordan to Antigua.

It may not be generally known that the root bark of the cotton plant is used medicinally. Directions for preparing extracts and decoctions of cotton root bark are included in the 'Indian and Colonial Addendum' of the *British Pharmacopœia*.

The *West India Committee Circular* of January 31 contains a report of Mr. W. G. Freeman's lecture on the 'West Indian Fruit Industry.' The chair was occupied by Sir Wm. Thiselton Dyer. A portrait of Mr. Freeman accompanies the report.

The Governor of Jamaica has approved different rates being charged for the conveyance of bananas on the Jamaica railway at different periods of the year: a higher rate at the period when prices of fruit are higher, and a lower rate when prices are less.

Quite a large number of trees have been planted by the King. It is now always expected that whenever he stops at a country house a tree will be planted in commemoration of the visit. Many he planted as Prince of Wales have now assumed goodly proportions. (*Barbados Daily News*.)

Professor Harrison writes to the Imperial Commissioner of Agriculture: 'The results of this year's manurial experiments with the varieties [in British Guiana] are most striking and supply overwhelming proof that the new varieties are very similar to the Bourbon in their manurial requirements.'

The Imperial Commissioner of Agriculture will attend the Agricultural Show to be held at Grenada on March 16 and 17. A meeting of the Experiment Committee of the Agricultural and Commercial Society has been arranged for March 15, at which the Commissioner will attend for the purpose of conferring with the members.

An account is given in the *Nineteenth Century and After* of what is described as 'the world's greatest discovery in horticulture'—the production of a coreless apple. When grown by itself, and therefore not subject to cross pollination, the tree is incapable of bearing fruits with seeds in it. It is stated: 'The coreless apple will produce as great a sensation when brought before the public as the seedless orange did a few years ago.'

We are informed that Dr. Carl Otto Weber, the well known chemical authority on india-rubber, died suddenly on January 14 at his residence in Massachusetts, U.S.A. (*Nature*.)

The measures taken by the Government for ensuring the purity of French Guinea rubber have been completely successful, and that product has now an assured position on the markets of Europe. (*Consular Report* on French Guinea.)

During the past fortnight 5 bales of West Indian cotton have been imported. Medium fine is quoted in Liverpool at 4.5d. per lb.; and West Indian Sea Island, medium fine, 11½d. per lb.; fine, 12½d. per lb.; extra fine, 14½d. per lb. (*West India Committee Circular*.)

In the Governor's address at the opening of the Combined Court at British Guiana it was stated that it was proposed to amalgamate the Board of Agriculture, the Government Laboratory, and the Botanic Gardens in the Department of Science and Agriculture under the guidance of Professor Harrison.

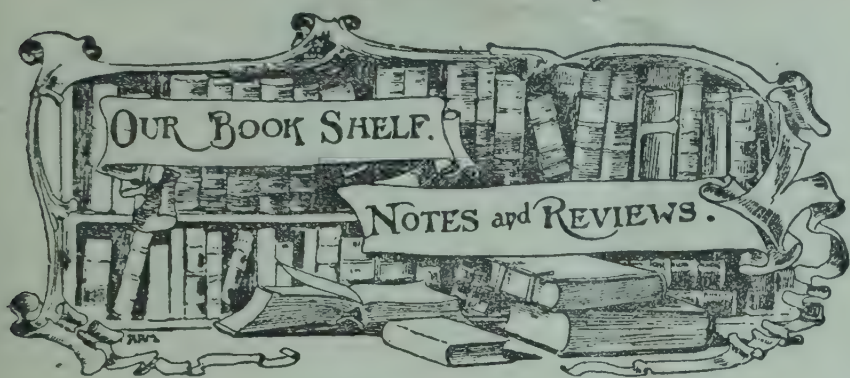
The annual meeting of the British Honduras Society of Agriculture and Commerce was held on January 13 last. A letter was read in which his Excellency the Governor made the suggestion that a Bill should be prepared for giving a legal status to the society with the view of securing permanency of its operations and so ensuring the life of the society. The suggestion was referred to a committee for consideration.

In a letter to the Demerara *Argosy* the Hon. B. Howell Jones makes the following sporting offer to the Editor of the *Chronicle* in connexion with a discussion on cane farming: 'If he will get one of the Agricultural Instructors to visit Pln. La Bonne Mère, and the Instructor reports favourably upon the farmers' cane cultivation, I shall be most pleased to hand over the sum of \$10 to the Rescue House of the Salvation Army.'

Mr. A. J. Brooks writes from Dominica that Emilia Détoches was awarded the Banksian medal and a special prize of £1 by the council of the Royal Horticultural Society for exhibits of meals and starches at the recent exhibition of colonial fruit. This exhibitor obtained a Diploma of Merit, as well as nine special prizes and one first prize, for similar exhibits at the Agricultural Show held at Dominica on February 24 and 25, 1904.

In reference to the note in the *Agricultural News* (Vol. II, p. 328) to the effect that in the Malay States an Inspector had been appointed under the 'Cocoa-nut Trees Preservation Enactment' to ensure united and systematic action against the enemies of the cocoa-nut palm, it may be mentioned that, according to the *Annual Report* for 1903, 'the plantations are still remunerative, and the damage caused by beetles is now insignificant.'

According to a note in the *Pharmaceutical Journal*, the seeds of the baobab tree (*Adansonia digitata*), a native of tropical Africa, which is to be found in some of these islands, contain an oil which might advantageously be used in the place of cocoa-nut oil in the manufacture of vegetable lards, and also for high-priced toilet soaps and unguents. Seeds examined by Balland yielded 63.3 per cent. of kernels which contained 63.20 per cent. of a whitish, solid fat.



PRECIS OF INFORMATION FOR THE LEEWARD ISLANDS, 1904.

This work, which is dedicated by permission to his Excellency Sir Gerald Strickland, K.C.M.G., 'was originally intended to be a hand-book for 1904. Difficulties in printing and revision have, however, made this object impossible.'

A large amount of useful information is contained in this publication which might well be embodied in an annual hand-book such as that issued in Jamaica.

A list is given of the plants of the Leeward Islands as well as of the useful trees, birds, etc. This book also contains general information on agricultural subjects that is likely to be useful to planters and small settlers.

DOMINICA: By H. A. Alford Nicholls, C.M.G., M.D., F.L.S. *Antigua:* José Anjo.

This is a little descriptive guide to Dominica, 'the loveliest and grandest island of the Caribbean Archipelago,' copiously illustrated with views of typical scenery and places of interest.

A good brief account of the physical features and the history of the island is given. The advantages of Dominica's mountains as a site for a West Indian sanatorium are urged: in those districts there are no malarial mosquitos, the nights are cool, the air bracing, and the scenery magnificent. The chief requirement, in order to attract visitors to the island, is a small, but good-class, hotel where visitors could be made thoroughly comfortable at a moderate cost.

Dr. Nicholls also gives a brief account of the agricultural industries of the island—both former and present.

CULTIVATION AND PREPARATION OF PARA RUBBER: By W. H. Johnson, F.L.S., F.R.H.S., Director of Agriculture, Gold Coast Colony. London: Crosby, Lockwood & Son, Ludgate Hill, 1904.

This treatise has been written with the object of affording practical advice to the continually increasing number of persons taking up rubber cultivation. It is mainly a result of information gained during an official visit paid to Ceylon by the author in 1902 for the purpose of studying the methods employed there in the cultivation of the Para rubber tree and the preparation of its product for the market.

As a result of the introduction of this tree into our Eastern tropical possessions in 1876, through the agency of the Royal Botanic Gardens, Kew, an important industry has developed in the Malay Peninsular and Ceylon, and it is suggested that the planting of areas with it is worthy of the consideration of the Governments of other colonies.

Mr. Johnson therefore supplies full information as to the requirements of *Hevea brasiliensis*, its planting and cultivation, the collection of its latex, and the preparation of commercial rubber from the latex. In regard to tapping instruments, the author favours the Ceylon one, a full description of which is given on p. 51 of this issue of the *Agricultural News*. Aluminium collecting vessels are recom-

mended which can be fixed into position by pressing the edge into the bark of the tree.

A method of preparing the rubber is suggested, and the author points out some of the causes of poor results that have been obtained by some methods.

The chapter on the 'Establishment and Maintenance of a Para Rubber Plantation' gives useful information in regard to expenses and probable profits.

This work, which is nicely got up and contains several good illustrations, is likely to prove of considerable value to rubber planters.

MONTSERRAT.

Experiment Stations.

In connexion with the departure from Montserrat of Mr. A. J. Jordan, the *Herald* has the following review of agricultural efforts in that island during the last five years:—

The Agricultural Department is part of the Imperial Department for the West Indies, and was started as the outcome of the Royal Commission. The work was commenced in February 1900. The organization was entrusted by the Secretary of State for the Colonies to Sir Daniel Morris and bears the stamp of his genius.

Isolated efforts had been made before by individual planters, but the futility of such isolated efforts has been clearly demonstrated by the complete disappearance of all traces of them.

About £2,500 have been spent from Imperial funds, and this amount has been almost entirely circulated in the island.

In return we have three stations in full work, and from these have been distributed during the past five years:—67,000 plants, 130,000 cuttings, 96,000 seedlings, besides several tons of seed.

One most important part of the work is the training of youths in modern agriculture. The boys have gone forth with certificates, one for two years' and the other three years' training. The foreman and two sub-foremen were trained at the stations. There are some six boys now in training.

The experiments have been, as far as possible, carried out on field lines and the cost of cultivation given. These should be of the greatest value and have made many points clear, and a considerable amount of information has been collected and recorded in an accessible manner.

Like the work of the school and the church, much good is done by example and influence that cannot be represented on paper or computed by figures.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados in S.S. 'Dahome' on Tuesday, February 21 on a visit to the Northern Islands. As already mentioned Sir Daniel Morris will attend the Agricultural Shows at Dominica, Montserrat, and Nevis, returning to Barbados on March 3.

Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist on the staff of the Imperial Department of Agriculture, left Barbados in R.M.S. 'Eden' on Monday, February 13, for Antigua. Mr. Lewton-Brain is expected to return to Barbados on March 3 next.

MARKET REPORTS.

London,—January 31, 1905. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' January 27, 1905; and 'THE PUBLIC LEDGER,' January 21, 1905.

ALOES—Barbados, 15/- to 35/-; Curaçoa, 15/6 to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.

BEES'-WAX—£7 to £7 7s. 6d. per cwt.

CACAO—Trinidad, 56/- to 60/- per cwt.; Grenada, 52/- to 54/- per cwt.; Dominica, 48/- to 54/- per cwt.; Jamaica, 48/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.

COTTON—West Indian Sea Island, medium fine, 11½d.; fine, 12½d.; extra fine, 14½d. per lb.

FRUIT—

BANANAS—4/- to 6/- per bunch.

ORANGES—6/- to 8/- per case.

PINE-APPLES—St. Michael's, 1/9 to 2/3 each.

FUSTIC—£3 10s. to £4 per ton.

GINGER—Jamaica, fair bright, 37/-; ordinary to good ordinary, 27/- to 30/- per cwt.

HONEY—Jamaica, 16/- to 22/6 per cwt.

ISINGLASS—West Indian lump, 2/3 to 2/9; cake, 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £13 15s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/2½ per lb.

LOGWOOD—£4 2s. 6d. to £5; Roots, £4 to £4 10s. per ton.

MACE—Good pale, 1/5; red, 1/3; broken, 1/- per lb.

NITRATE OF SODA—Agricultural, £11 5s. per ton.

NUTMEGS—62's, 1/6; 80's, 11d.; 120's, 5¼d. per lb.

PIMENTO—2½d. per lb.

RUM—Demerara, 1s. to 1s. 3d. per proof gallon; Jamaica, 2s. per proof gallon.

SARSAPARILLA—7½d. to 1/2 per lb.

SUGAR—Yellow crystals, 24/- to 25/6 per cwt.; Muscovado, 19/- per cwt.; Molasses, 16/- to 19/- per cwt.

SULPHATE OF AMMONIA—£13 7s. 6d. per ton.

Montreal,—January 14, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 28c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.95 to \$4.00 per 100 lb.

—Muscovados, 89°, \$3.45 to \$3.55 per 100 lb.

—Molasses, 89°, \$3.05 to \$3.15 per 100 lb.

—Barbados, 89°, \$3.20 to \$3.30 per 100 lb.

New York,—February 3, 1905.—Messrs. GILLESPIE Bros. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11½c.; Trinidad, 12c. to 12½c. Jamaica, 9½c. to 10c. per lb.

COCOA-NUTS—Trinidads, \$28.00 to \$30.00 per M., selected; Jamaicas, \$30.00 to \$32.00 per M.

COFFEE—Jamaicas, 9c. to 9½c. per lb. (ex store).

GOAT SKINS—Jamaicas, 57c. per lb.

GRAPE FRUIT—Jamaicas, \$3.00 to \$4.00 per barrel.

ORANGES—Jamaica, \$3.25 to \$3.75 per barrel (stem cut).

PIMENTO—4½c. per lb.

SUGAR—Centrifugals, 96°, 5½c.; Muscovados, 89°, 4½c.;

Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—February 11, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$10.00 to \$10.50 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.00 to \$12.00 per 100 lb.

HAY—90c. to 95c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00.

MOLASSES.—20c. per gallon.

ONIONS—Lisbon (stringed), \$3.77 to \$4.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$2.50 to \$3.00 per 160 lb. (retail).

RICE—Ballam, \$4.75 to \$4.85 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR.—Muscovados, 89°, \$2.75; Dark crystals, 96°, \$3.50 per 100 lb.

British Guiana,—February 9, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$6.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14½c. to 15c. per lb. (retail).

—Creole, 12c. to 14c. per lb.

DHAL—\$4.50 per bag of 168 lb.

EDDOES—\$1.56 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Lisbon, \$4.00 per 100 lb. (ex store).

PEA NUTS—American, 6c. per lb. (retail).

PLANTAINS—24c. to 48c. per bunch.

POTATOS, ENGLISH—Picked, \$2.50 to \$2.75 per barrel.

RICE—Ballam, \$4.35 to \$4.40 per 177 lb.; Creole, \$4.15 per bag.

SWEET POTATOS—Barbados, \$1.44 per bag; \$1.56 per barrel.

TANNIAS—\$1.80 per barrel.

YAMS—White, \$1.80 per bag.

SUGAR—Dark Crystals, \$3.60; Yellow, \$4.25 to \$4.30; White, \$4.90 to \$5.00; Molasses, \$3.00 to \$3.25 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—February 9, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary \$11.85 to \$12.00; Estates, \$12.10 to \$12.25; Venezuelan, \$12.10 to \$12.50 per fanega (110 lb.).

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 8½c. to 8½c. per lb.

COPRA—\$3.10 to \$3.20 per 100 lb.

MOLASSES.—17c. to 18c. per gallon.

ONIONS—Stringed Madeira, \$3.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.20 to \$1.25 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; White Table, \$4.60 to \$5.75 per bag.

SUGAR—Yellow crystals, \$4.00; bright molasses sugars, \$3.00 per 100 lb.

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The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain, amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied:—

- (3) Seedling and other Canes at Barbados, in 1900. Price 2d. Post free, 2½d.
- (5) General Treatment of Insect Pests, 2nd. Edition Revised. Price 4d. Post free, 4½d.
- (6) Recipes for cooking Sweet Potatoes. Price 2d. Post free, 2½d.
- (7) Scale Insects of the Lesser Antilles, Part I. Price 4d. Post free, 5d.
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- (16) Hints on Onion Cultivation. Price 2d. Post free, 2½d.
- (17) General Treatment of Fungoid Pests. Price 4d. Post free, 5d.
- (18) Recipes for cooking West Indian Yams. Price 2d. Post free, 2½d.
- (19) Seedling and other Canes at Barbados, in 1902. Price 4d. Post free, 5d.
- (20) Seedling and other Canes in the Leeward Islands, 1901-1902. Price 2d. Post free, 2½d.
- (21) Cotton and Onion Industries in the West Indies. Price 2d. Post free, 2½d.
- (22) Scale Insects of the Lesser Antilles, Part II. Price 4d. Post free, 5d.
- (23) Notes on Poultry in the West Indies. Price 4d. Post free, 5d.
- (24) Dominica, Hints to Settlers. Price 2d. Post free, 2½d.
- (25) Ground Nuts in the West Indies. Price 2d. Post free, 2½d.
- (26) Seedling and other Canes at Barbados, in 1903. Price 4d. Post free, 5d.
- (27) Seedling and other Canes in the Leeward Islands, 1902-1903. Price 2d. Post free, 2½d.
- (28) Barbados and Porto Rico Molasses. Price 3d. Post free, 3½d.
- (29) Lectures on the Diseases of the Sugar-cane. Price 4d. Post free, 5d.
- (30) Manurial Experiments with Sugar-cane in the Leeward Islands, 1902-3. Price 4d. Post free, 5d.
- (31) A. B. C. of Cotton Planting. Price 4d. Post free, 5d.
- (32) Seedling and other Canes at Barbados, in 1904. Price 4d. Post free, 5d.

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A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199). Price, limp cloth 2s., or in a superior style of binding 2s. 6d. Postage in either binding, 3½d. extra.

The 'AGRICULTURAL NEWS.' A Fortnightly Review.

The 'Agricultural News' contains extracts from official correspondence and from progress and other reports; and, in fact, any information indicating what is going on in each colony and the progress made in Agricultural matters throughout the West Indies.

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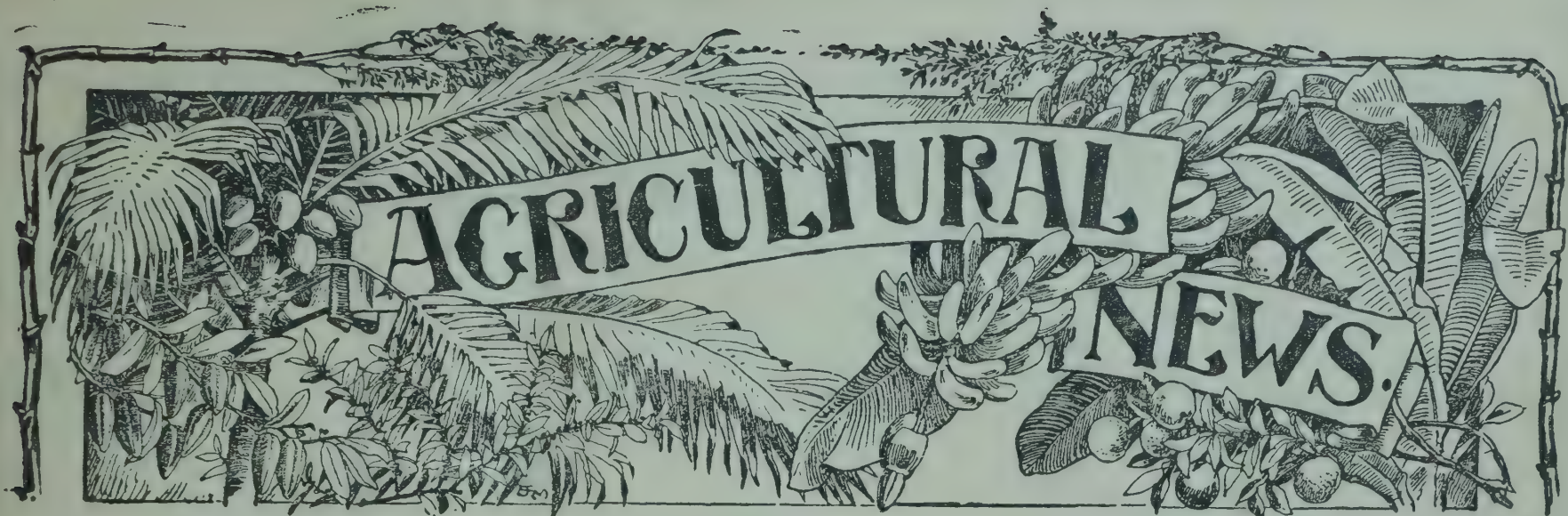
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Cotton Prospects.

IN the *Agricultural News* (Vol. III, p. 417) attention was drawn to the fact that owing to the colossal crop of cotton produced in the United States in the autumn of 1904 a considerable fall in prices had been the result. This fall specially affected the ordinary or Upland cotton.

During the early part of 1904 the prices of Upland cotton reached about 9d. per lb. Quite lately prices have fallen to less than 4d. per lb. As stated by Mr. C. M. Wolstenholme, this sudden break in prices in Upland cotton should prove to planters in the West Indies the folly of suggesting the planting of any other than long-staple cotton. The soil, climate, and labour conditions existing at Barbados, St. Vincent, Montserrat, Antigua, and St. Kitt's-Nevis have shown that with care in cultivation and in picking at exactly the right stage, and free from all extraneous matter, these islands are capable of growing Sea Island cotton of the highest quality and at a lower cost than in any other part of the world.

It is true that the prices of Sea Island cotton have also declined in sympathy with the fall in Upland cotton, but, so far, the Sea Island cotton shipped from the West Indies (thanks to the efforts of the British Cotton-growing Association) has met with a very favourable reception, and the prices of the best qualities are only a little below those of last year. For instance, of 24 bales of Sea Island cotton shipped from Barbados in R.M.S. 'Orinoco' on January 15 last, 14 bales sold at 16½d. per lb., 6 bales at 16d., and 4 bales at 15d. per lb. The best qualities were described as 'clean, very bright and extra-fine long staple;' the poorer qualities 'bright and fine but little stained and wanting in preparation.' The difference of 1½d. per lb. between the best and lowest qualities in this instance was due to the method adopted in the cultivation and, in one case, to carelessness in picking. A further lot of 10 bales of West

Indian Sea Island cotton, shipped from Barbados by Messrs. H. E. Thorne & Son, was also sold at 16½*d.* per lb. A small lot of 3 bags of very fine cotton shipped from St. Kitt's obtained similar prices.

As shown in a recent letter received from the British Cotton-growing Association, published in another column, the above are regarded as splendid prices, but it will be impossible to obtain them 'unless the cotton has been exceptionally well cultivated and well harvested.'

From another source the Imperial Commissioner of Agriculture was informed that the first consignment of Barbados Sea Island cotton 'leaves little to be desired;' also that in brightness and lustre, the best cotton shipped during this season from the West Indies 'far excels the Carolina cotton, though the latter has the advantage in hardness [strength] of staple.'

While it must be a source of great satisfaction to cotton growers in these colonies to receive such glowing reports on their first shipments this year, especially in view of the drop in prices, it is only right that they should realize that these reports apply only to cotton of the highest quality raised from Rivers' seed and where the most careful attention has been devoted to it during growth, as well as in ginning and baling.

In cases where inferior seed has been used, or where the land is poor and the cotton worm has not been kept in check, it will be impossible to realize the prices above referred to. It is hoped, therefore, that the publication of these figures will not lead to false expectations. There is, probably, no crop where skill and unremitting attention receive so large a reward as in growing and marketing Sea Island cotton.

Anxiety has been expressed in some quarters whether the high prices at present ruling for sugar may not lead the planters to devote less attention to cotton and thus result in the undoubtedly favourable position obtained for West Indian Sea Island cotton during the last two years being abandoned in favour of sugar. It is, however, to be borne in mind that the present prices for sugar are not likely to continue, and that cotton of the finest quality will grow in soils and under conditions that will not yield large crops of canes. There is also to be considered the possibility in some islands, as at St. Kitt's, of growing cotton as a catch crop on cane lands. If the land, already prepared and manured for sugar-cane, is planted with cotton, say in June or July, the cotton will be ripe for picking from the beginning of November to the end of

January. The cotton plants could then be removed, and the growing canes (planted in November or December) left in undisturbed possession of the land. It remains to be proved whether this plan is capable of being fully carried out on a large scale. In any case the land, if required to bear a double crop, must receive high cultivation and be well manured.

The preferable arrangement would be to grow the canes in the best soils with a good rainfall and plant the cotton by itself in the lighter lands under drier conditions. It has been shown that cotton will flourish with a much lower rainfall than the sugar-cane. In fact, during the present exceptionally dry season at St. Kitt's, Nevis, Antigua, and Montserrat cotton has yielded fairly large crops in districts where the sugar canes are stunted and poor. Under such circumstances cotton would pay better than sugar.

Just now, when the first pickings of cotton are over, it is desirable that the cotton plants, if still vigorous and healthy, should be retained for the second pickings which should come on about the end of March and the beginning of April. In cases where the old shoots are dry and withered these might be cut out to allow the new growths around the base to develop and bear crops. If, however, the leaf-blister mite is prevalent, this latter plan would have to be abandoned and the plants removed at once in order not to encourage the mite and other pests.

It is strongly recommended that all the cotton fields in the Windward and Leeward Islands be cleared, and the refuse burnt, by the end of May, or at all events before the new crop appears above ground. It is only by such means that the mite, rust, mildew, and other pests can be kept in check and the cotton plants generally maintained in a healthy condition. The soundness of this advice has been abundantly proved during the last year. Wherever an attempt has been made to ratoon cotton, that is to carry it over from one season to another, the result has been uniformly unsatisfactory. The plants have been weak and sickly, and the quality of the fibre has been impaired. This was specially dwelt upon by Mr. E. L. Oliver during his recent visit to the West Indies. It would appear, from the experience of recent years, that the finest sorts of Sea Island cotton can only be produced in these islands by annual sowings in fresh soil.

The most favourable months for planting in the Windward and Leeward Islands are now shown to be from June to September, depending on the rains. The land should be well prepared and

manured beforehand. The best seed only should be sown. During crop time all the cotton seed should be retained, crushed by means of a disintegrator, and fed to animals. Where this is not practicable, the whole (or crushed) seed may be used as manure. If the cotton seed produced in these colonies be exported, it will be impossible to retain the fertility of the soil and the quality of the cotton will rapidly deteriorate. Later it may be found desirable to establish oil mills in the West Indies and thus utilize all the available products of the cotton plant.

SUGAR INDUSTRY.

Seedling Canes in the Leeward Islands.

Pamphlet No. 33, issued to-day, contains a summary of the results of the cultivation of seedling and other canes in the Leeward Islands during the season 1903-4. The following extracts from this pamphlet will indicate the nature of the results obtained:—

The canes that gave the best results as plant canes at Antigua last year were: Sealy Seedling, B. 156, B. 306, and B. 208. The same four, but in a different order, head the table of means for three years, and are, therefore, together with B. 109 and D. 95, mentioned as promising canes for Antigua. Judged as ratoon canes, B. 109, Sealy Seedling, B. 306, and D. 95 gave good results. It will be seen that Sealy Seedling and B. 306 have distinguished themselves in Antigua both as plant canes and as ratoons.

At St. Kitt's the first place among plant canes last season was obtained by B. 393, closely followed by B. 208. The latter cane heads the table of means for four years. Among ratoon canes the best were D. 115, B. 306, and B. 208, the same three occupying the head of the table of means for three years, though in different order.

ANTIGUA.—PLANT CANES.

If we take the first seven canes occurring at each station as being above the average, or worthy of attention, and see how far there is agreement between the lists, we obtain useful information. We find that at the eight stations twelve in all have come within the limit of the first seven canes; of these,

B. 306	... has come within the first 7 on 8 stations.
B. 156	... " " " " " 7 " 8 "
Sealy Seedling	} ... " " " " " 7 " 8 "
B. 208	... " " " " " 7 " 6 "
D. 95	... " " " " " 7 " 6 "
D. 74	... " " " " " 7 " 6 "
D. 102	... " " " " " 7 " 4 "
D. 116	... " " " " " 7 " 3 "
D. 115	... " " " " " 7 " 2 "
Mont Blanc...	... " " " " " 7 " 2 "
D. 78	... " " " " " 7 " 1 station.
D. 130	... " " " " " 7 " 1 "

This is a remarkably close agreement and indicates that Sealy Seedling, B. 306, B. 156, B. 208, D. 95, and D. 74 are calculated to give good returns in all the districts covered by these experiments. That these six canes come out so compact a group affords a sense of security to those who wish to plant them.

ANTIGUA.—RATOONS.

We may classify the ratoon canes, as we have already classified the plant canes, by ascertaining which rank amongst the first seven at each of the six stations. We find that these (7 x 6) forty-two places are occupied by fifteen canes; of these,

Sealy Seedling	} ... has come within the first 7 on 5 stations.
B. 306	... " " " " " 7 " 5 "
B. 109	... " " " " " 7 " 4 "
D. 102	... " " " " " 7 " 4 "
Mont Blanc...	... " " " " " 7 " 4 "
B. 208	... " " " " " 7 " 3 "
B. 156	... " " " " " 7 " 3 "
D. 130	... " " " " " 7 " 3 "

The rainfall for the season under review was so badly distributed as to handicap severely many of the promising varieties. The bad distribution, however, affords a means of ascertaining which canes are calculated to stand adverse circumstances. In this respect Sealy Seedling and B. 306 appear to have distinguished themselves this season in Antigua, when both plant canes and ratoon canes are considered.

ST. KITT'S.—PLANT CANES.

Taking the average results for this season, B. 393 occupies first place, followed closely by B. 208. The order for this season is very different from that of last: it is possible that the unusual character of the rainfall accounts for this. The rainfall at the several stations has varied greatly both in quantity and the manner in which it fell; this may have influenced the various canes in different ways.

If we examine the first seven canes at each station, we find that they embrace a greater number than was the case in Antigua, seventeen canes occurring amongst the first seven at eight stations; of these,

B. 393	... has come within the first 7 on 8 stations.
B. 208	... " " " " " 7 " 6 "
D. 74	... " " " " " 7 " 5 "
White Transparent	} ... " " " " " 7 " 5 "
B. 109	... " " " " " 7 " 4 "
B. 306	... " " " " " 7 " 4 "
Mont Blanc	... " " " " " 7 " 4 "

The foregoing seven canes thus appear to be generally suitable over a wide range of soil and climate. This is particularly the case with B. 393, which has suddenly come into prominence in these experiments in St. Kitt's, for it occurs amongst the first seven at all the eight stations, while B. 208 similarly appears at six.

ST. KITT'S.—RATOONS.

B. 376	... has come within the first 7 on 5 stations.
B. 208	... " " " " " 7 " 4 "
B. 306	... " " " " " 7 " 4 "
White Transparent	} ... " " " " " 7 " 4 "
Naga B.	... " " " " " 7 " 4 "
D. 115	... " " " " " 7 " 4 "
D. 74	... " " " " " 7 " 4 "
B. 109	... " " " " " 7 " 4 "

These canes therefore appear suitable for ratooning over the range of soil and climate covered by these experiments. D. 74, White Transparent, and Naga B. possess drought-resisting qualities, while B. 109 and B. 306 require a good rainfall.



WEST INDIAN FRUIT.

SHOW OF COLONIAL FRUIT.

In reference to a note in the *Agricultural News* (Vol. IV, p. 20) to the effect that a second show of colonial fruit was to be held by the Royal Horticultural Society on Thursday and Friday, March 30 and 31, it may be mentioned that the prize list shows that provision has been made for, among others, the following exhibits with which fruit growers in the West Indies are more particularly interested:—

DIVISION I. COLONIAL-GROWN FRUIT.

- Class 5.—Pine-apples.
- „ 6.—Bananas.
- „ 7.—Mangos.
- „ 8.—Grapes.
- „ 9.—Oranges.
- „ 10.—Limes and Lemons.
- „ 11.—Shaddocks, Pomelos, and other like fruit.
- „ 17.—Any other colonial-grown fruit.

DIVISION II.—COLONIAL-GROWN VEGETABLES.

- Class 18.—Yams, Sweet Potatos, and other tubers.

DIVISION III.—PRESERVED FRUITS, JAMS, ETC.

This division includes exhibits of colonial-grown and colonial-prepared fruits—bottled, tinned, or dried; colonial-grown and colonial-preserved vegetables; and colonial-grown fruits made into jam, jelly, syrup, etc., in the colony.

CANNING PINE-APPLES IN HAWAII.

In the *Agricultural News* (Vol. III, p. 340) an extract appeared with regard to canning pine-apples in Hawaii. Writing on the subject of pine-apple cultivation in those islands in the *Hawaiian Forester and Agriculturist*, Mr. J. Kidwell states:—

Perhaps the most important thing in connexion with this industry is to have an efficient canning plant, for as has been said before, the shipping of fresh pines has many drawbacks; but given enough growers in one neighbourhood to support a well-equipped cannery, then, with reasonable effort, success ought to be assured. Without any desire to advertise any particular system of canning plant, it may not be amiss to say that the 'Baker Process' is a very convenient one, so far as cooking the fruit is concerned, and there may be others quite as good.

This is the one that was installed by the Hawaiian Fruit and Packing Company, Ltd., of which the writer was manager. It had a capacity of 10,000 cans per day, and as

the process could be regulated to a nicety, the output was entirely uniform. Much testimony was received by us that no pines had ever been put on the American market that could come near ours in quality. The last shipment made by us brought \$2.35 per dozen cans, of 2½ lb. each, ex ship at San Francisco.

THE PAPAW IN THE TRANSVAAL.

In an article on 'Some Tropical Fruits' in the *Transvaal Agricultural Journal* the following mention is made of the papaw:—

The papaw is largely grown in the warmer districts of the Transvaal. It would be too much to say that it has received any encouragement in the way of careful cultivation, but, notwithstanding this, it has grown and flourished to a very considerable extent. In some parts it has attained luxuriant proportions when growing in an absolutely wild condition. The fruit is offered for sale on many of our markets, but prices obtained have not been such as to encourage propagation commercially.

Latterly, a new use has been found for this fruit which may possibly change its history in this country, as it has already done in some of the islands of the West Indies.

Owing to its medicinal qualities, certain manufacturing chemists in America have been utilizing the juice for the purpose of preparing a medicine, having many similar qualities to pepsin. The demand has been such as to have caused inquiries to be made as to the availability of the resources of this colony as a further source of supply.

BEE KEEPING.

Pigeon Pea as a Honey Flower.

Mr. A. J. Brooks writes from Dominica with regard to the value of the pigeon pea as a honey flower as follows:—

It does not appear to be generally known that the pigeon pea (*Cajanus indicus*) is a fairly valuable bee plant.

Honey produced from this flower is of an excellent standard, being of a clear light-amber colour, free from that rankness which new honey often possesses, and of a good thickness. This flower has an additional advantage in that it flowers in the fall of the year when bee flowers are very scarce. This honey is preferable to the 'lime' honey owing to its more delicate flavour and thickness. In my opinion, it is only surpassed by the noted 'logwood' honey.

COTTON INDUSTRY.

Sea Island Cotton Market.

We extract the following from the report, dated Charleston, February 4, of Messrs. Henry W. Frost & Co.:—

The demand this week was limited to the odd bags of fully fine to be had at 23c. and a crop lot, J.E.F. 20 bales at 27c. There continues to be a very limited demand for the crop lots and no demand for 'Tinged Stained,' of which there are now in stock about 600 bales and for which, in the absence of demand, factors are continuing to hold for our previous quotations, but would make concessions to effect sales.

We quote [on February 18]: stained and tinged, 13c. to 18c.; fine, 20c.; fully fine, 23c. to 24c.; extra fine 25c. to 26c.; extra-fine crop lots 26c. to 28c.; extra-extra-fine crop lots at 48c.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop:—

Mr. Shepherd reports that in St. Kitt's picking of cotton is now nearly finished and ginning is being pushed on as rapidly as possible. 'Applications for Rivers' seed for planting next season are coming in, and the amount applied for shows what a high opinion planters have of this seed.'

Mr. Sands reports that during the past fortnight he had visited several of the cultivations along the windward coast in St. Vincent, and found that there was very little cotton remaining to be picked. The earlier cotton had done best, the later plantings having been more or less of a failure. 'The poor yield is attributed to the persistent attacks of anthracnose of the bolls.' A few orders have been received for seed for planting next season. Many planters are expected to select seed from the present crop, as they hope by so doing to obtain a hardier plant.

Sale of West Indian Cotton.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture by the Vice-Chairman of the British Cotton-growing Association, dated Manchester, February 14, 1905:—

We have been talking over the arrangements for selling the cotton, and we have finally decided that the best plan will be for us to charge 1 per cent. commission, which will include the usual selling charges in Liverpool; and, of course, out of pocket expenses such as warehousing, handling, insurance, etc., will be charged in addition. As we are paying out of the 1 per cent. the brokers' selling charges, it will only leave us a small margin, but this will be quite sufficient. Our great object is to make the cotton growing a satisfactory industry for the planters, so that they will continue it.

It would, perhaps, be as well if you were to make a public announcement that we are prepared to sell any cotton sent to us on the above terms, so that there may be no misunderstanding. We did propose before to charge 2 per cent., which would have included some of the handling charges in Liverpool, but we find that these vary so much with each shipment that it is quite impossible to fix a covering rate which would be fair to both sides. In some

cases we might clear perhaps 1 to 1½ per cent., and in other cases we should possibly lose money, so I think that the new proposal of 1 per cent. will be the fairest to all sides.

I have already written you to tell you that we have been able to make very good arrangements for the sale of the cotton, and to prevent the price being broken, but it very much depends on whether the planters consign their cotton to us for sale. If they do this, I think we can almost guarantee to be able to keep the price up to, at the very lowest, 1s. per lb., but if the cotton is sent to London or elsewhere, there will be a great danger of it being offered all over the market, with a consequent breaking of the price. It is, therefore, to the planters' interests to send their cotton to us, and I think you will agree with me that 1 per cent. commission is not an unreasonable amount for them to pay.

As regards the price, I do not think there will be any fear, if the bulk of the cotton comes to us, of the price dropping below 1s., and I hope that the better lots of cotton will fetch very much higher prices than this. We have just sold one of the first consignments at 16d. per lb., and a few bales fetched 16½d. This is a splendid price, and I am very pleased with it, but I hope that it will not lead to any false expectations, because we certainly shall not be able to get so high a price for cotton unless it has been exceptionally well cultivated and well harvested. The particular cotton was one of the best samples I have ever seen—silky and gathered when it was just in the pink of condition. You will realize this better when I tell you that some of the best qualities of American 'Island' cotton are selling to-day at very little over 14d. per lb.

Jamaica.

The *Annual Report* on Jamaica for the year 1903-4 has the following reference to the prospects of cotton growing in that island:—

The attention which has been given to the revival of cotton growing in the West Indies was participated in by Jamaica. Cotton figured for the first time for many years among the exports. In this year's statistics it should show an important advance as there has been considerable planting. There are thousands of acres of land in Jamaica, including some irrigable lands, which it has been demonstrated are admirably suited for the easy cultivation of cotton. The reason why the planting of cotton has not been taken up in Jamaica, as it has been in Barbados and some of the other Lesser Antilles, is simply because banana planting and other investments here offer a still more promising return. Investments of capital in cotton growing, however, offer at least as good a promise in Jamaica as anywhere else in the West Indies, and I should expect that there will be very shortly a considerable development of cotton planting on such lands as I have referred to, which are not suitable for banana, chocolate, or other established staples.

I may observe that if cotton ginneries should be established in suitable neighbourhoods, it is probable that a large supply of cotton might, in a few years' time, be obtainable from small cultivators. An experiment is being made by the Board of Agriculture in this direction by placing one of the cotton gins presented to this island by the British Cotton-growing Association under the control of one of the local agricultural societies. A power gin, also presented by the Association, is being worked by Mr. Fursden, a member of the Board of Agriculture, under the arrangement that he shall gin at a fixed rate all the cotton sent to him.

EDUCATIONAL.

St. Lucia.

The following note on agricultural education in St. Lucia appeared in the *Annual Report* on the colony for 1903:—

In July 1903 twenty-five teachers went into residence at the Union Agricultural School and passed a fortnight there, receiving lectures and practical demonstrations in agricultural subjects from the Curator and the Agricultural Instructor. The experiment proved very successful, and cannot fail to be of benefit both to the teachers themselves and to their pupils, as demonstrations and object-lessons on agricultural subjects now form a regular part of the ordinary school work. It is perhaps not too much to say that there has been a real awakening of interest in this direction among both teachers and scholars.

School Gardens in Jamaica.

The following is extracted from the *Journal of the Jamaica Agricultural Society* for January:—

The Travelling Instructors and Local Instructors have been visiting the various school gardens in the island, and reporting upon them. Some of the teachers have done wonders, more especially those who have been through the course of instruction at Hope, and who appear to have benefited greatly by their experience there. Mr. W. J. Thompson has visited twenty-three school gardens in St. Andrew, St. Thomas, and Portland, and in his report says: 'I was pleased to find that the teachers I came across are falling in with the idea of these school gardens. Some of them take a great interest in the work and in teaching the children, too, apart from the financial part of it. Also, some of the gardens are a long way in front of the others. I find that very few of the teachers know much about the use of improved implements, even a fork. We must not, however, expect them to become past masters in the technique of garden tools in a short time; it will be long before they can use them as well as they can use a pen.'

The tools recommended for school gardens are as follows:—

1 digging fork	1 water pot;	1 cutlass;
(four prongs);	1 draw hoe;	1 dutch hoe;
1 pruning saw;	1 spade;	1 garden trowel.

Dominica Agricultural School.

The following is the report of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.) on the recent half-yearly examination of the pupils of the Agricultural School at Dominica:—

None of the boys have been at the school for a year, and twelve of them have been admitted since the last half-yearly examination. Consequently, they have all taken junior papers in the present examination, and for the present year, at least, all the boys had better continue with the junior work. Out of twenty boys, twelve have obtained more than 50 per cent. of the total marks, and, of these, five have been admitted during the last six months.

Roudette and Cuffy have done very well in all subjects and have also obtained the highest marks for the science papers; Augustine and Prosper have also done fairly well. These four boys also did well at the last examination. Morancie is at the head of the new admissions. G. N. Pinard has again done poorly.

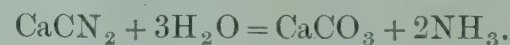
The Agricultural papers are among the best and they are fairly uniform; there are some very good papers in Arithmetic and also some very poor ones. The Botany and Geography are, on the whole, fair, though there are no very good papers. The Chemistry papers are the weakest, very few boys have obtained more than half the marks in this subject.

As much allowance as possible has been made for the evident difficulty some of the boys have in expressing their knowledge in English. Few of them, probably, before being admitted to the Agricultural School, habitually spoke anything but *patois*.

CALCIUM CYANAMIDE.

In connexion with the subject of the fixation of atmospheric nitrogen, mention has been made in the *Agricultural News* (Vol. III, pp. 279 and 343) of calcium cyanamide. In the first issue of the *Journal of Agricultural Science* there is an account by Mr. A. D. Hall, M.A, Director of the Rothamsted Experimental Station, of the preparation and properties of this substance, from which we take the following:—

Calcium cyanamide represents the first attempt on a commercial scale to bring atmospheric nitrogen into a state of combination, to manufacture, in fact, an artificial manure containing nitrogen derived from the air. The starting-point for the manufacture is the well-known substance calcium carbide, which is produced by heating in the electric furnace a mixture of chalk and coke or some other form of carbon. The calcium carbide, now so generally employed for generating acetylene for lighting purposes, is almost wholly made where cheap power to produce electricity can be obtained from a waterfall, and the manufacture of calcium cyanamide must naturally take place alongside, so as to secure a cheap supply of carbide. The remaining process is simple enough. The calcium carbide is reduced to a coarse powder, placed in a vessel resembling a gas retort and brought to a temperature approaching white heat, when a current of nitrogen gas is led over it until combination ceases. The result is a compound containing nearly 20 per cent. of nitrogen, crude calcium cyanamide, the formula of which when pure would be represented by CaCN_2 . The nitrogen required in the manufacture is obtained from the air in the simplest way by passing air through a heated cylinder packed with copper turnings; the oxygen combines with the copper, and the nitrogen passes forward into a gasholder until required. The copper is regenerated by passing a current of coal-gas through the heated cylinder. The resulting crude calcium cyanamide is a fine black powder, which decomposes rapidly when heated with water under pressure, and slowly with water at ordinary temperatures, into calcium carbonate and ammonia, in accordance with the equation:—



The manufacture of crude calcium cyanamide has not yet been taken up on a large scale. A model plant is in operation in Berlin capable of turning out quantities of about 1 ton per diem, and arrangements are being made with other firms to develop the process commercially.

As a manure it should be applied to the soil some little time before the seed is sown and should be lightly ploughed in, lest any loss of ammonia take place. It cannot well be mixed with other manures; with superphosphates, for example, the reaction is somewhat intense, and the whole mass becomes very hot.

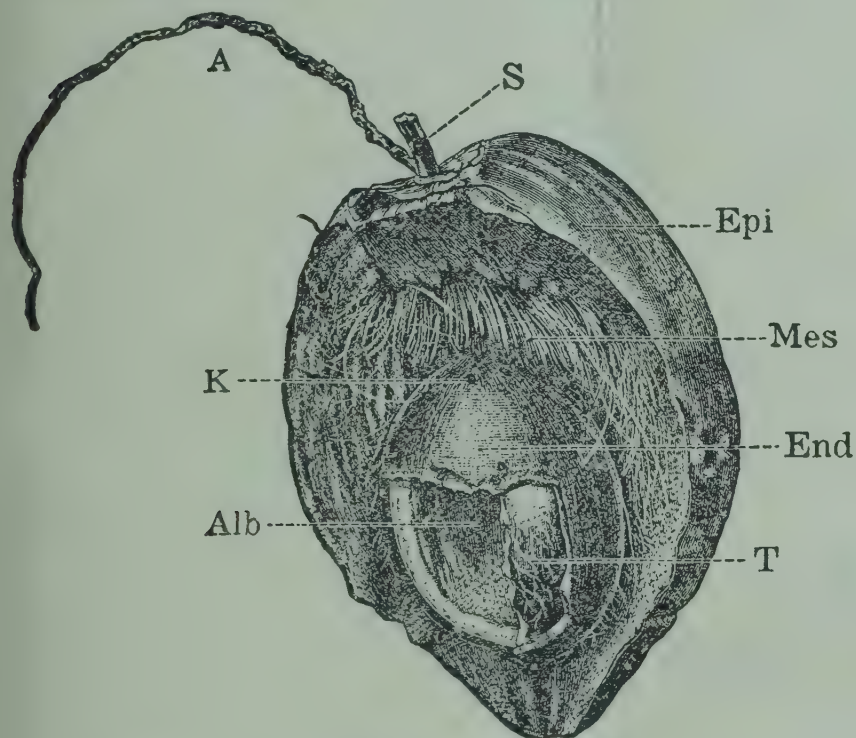
SCIENCE NOTES.

Structure and Germination of the Cocoa-nut.

In the accompanying illustrations fig. 3 shows the structure of the ripe cocoa-nut. S. is the lower part of the axis forming the stem, and A. is the upper end of the axis with scars of male flowers.

The fruit of the cocoa-nut palm (*Cocos nucifera*) is a large, one-seeded drupe. The outer shell, made up of the epicarp (Epi.) and mesocarp (Mes.), is of a fibrous texture and yields the fibre or coir of commerce. The next layer is the hard, bony 'shell.' This is the endocarp (End.). It has three marks or 'eyes' (K.), which correspond to the three loculi of the ovary. Through one of these the young plant pushes its way when the seed germinates.

The cavity of this inner shell is occupied by the seed, which consists of a seed-coat or testa (T.), the thin, brown membrane between the 'meat' and the inner shell, covering a large, hollow layer of solid albumen (Alb.) termed endosperm. The hollow space is partly filled with an unsolidified substance commonly known as 'milk.' In the endosperm, beneath one of the marks (the softest) at the base of the nut, is situated the embryo.

FIG. 3. STRUCTURE OF THE COCOA-NUT. $\times \frac{1}{5}$ [From *Bulletin Torrey Botanical Club*.]

Messrs. J. E. Kirkwood and Wm. J. Gies state, in their paper on 'Chemical studies of the Cocoa-nut,' published in the *Bulletin Torrey Botanical Club*, from which the accompanying illustrations are taken: 'The thick husk is remarkably adapted to the preservation of the seed whilst the nut is tossed about by the waves until it reaches some shore, it may be, far distant from that on which it grew. While immature the nut is without the solid endosperm, but is filled with a milky fluid. As it ripens, however, the endosperm, gradually develops and the milky juice diminishes in quantity.'

In planting the nuts should be placed on their sides in trenches in well-prepared nursery beds. 'When germination begins, the embryo elongates and, having pushed through its thin coverings, begins to enlarge at both ends. From the outer end arise the plumule and the roots; the inner end is an extension of the true cotyledon and is developed into a special absorbing organ.'

The shoots burst through the outer shell as shown in fig. 4. This figure shows the germinating cocoa-nut at the end of



FIG. 4. COCOA-NUT SEEDLING.

[From *Bulletin Torrey Botanical Club*.]

one year; the husk is little altered except where it was in contact with the earth.

KOLA IN WEST AFRICA.

The *Tropical Agriculturist* for January contains information on kola growing in West Africa, published in *Der Tropenpflanzer* by Dr. Gruner, who was deputed by the German Colonial Economic Committee to investigate the cacao and kola industries of West Africa. The following extracts are likely to be of interest:—

The tree begins to bear in its sixth or seventh year, and its yield gradually increases to an average of forty to fifty fruits per annum. There are two kola seasons, the less important in the July rains and the principal at the beginning of the dry season in November. The price in the producing districts varies from 3d. to 1s. per 100 nuts.

The export from the Gold Coast in 1900 was valued at £43,133, and in 1901 at £35,024. Attention is also being devoted to kola in the Botanic Gardens at Aburi.

In Lagos, at the Oloke-Meji Experiment Station, a nursery of 60,000 kola plants is at present maintained, and large kola plantations are being formed in the colony.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 63 of this volume.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

VOL. IV. SATURDAY, MARCH 11, 1905. No. 76.

NOTES AND COMMENTS.

Contents of Present Issue.

The prospects of cotton-growing in the West Indies are fully discussed in the editorial in this issue of the *Agricultural News*. Reference is made to the prices that are likely to be obtained for West Indian Sea Island cotton this season. This matter is further discussed in the letter from the Vice-Chairman of the British Cotton-growing Association published on p. 69.

On p. 67 extracts are reproduced from the pamphlet (No. 33), issued to-day, containing a summary of the results of experiments with seedling and other canes in the Leeward Islands.

Notes on the progress of efforts to introduce the teaching of agriculture into West Indian schools will be found on p. 70.

An illustrated article on the structure of the cocoa-nut and the changes that take place during germination is likely to be of interest to readers of the *Agricultural News*. (See p. 71.)

It is desired to draw special attention to the announcement made on this page that the Imperial Department of Agriculture is unable to obtain a supply of Sea Island cotton seed from the United States during the coming season.

An account of the Arrowroot or Canna Worm is given on p. 74, as also of a disease of stock known as Epizootic Lymphangitis.

In view of the efforts that are being made to develop the tobacco industry of Jamaica, the correspondence published on p. 77 is likely to be of interest.

Praedial Larceny.

It is proposed to bring together a 'Precis of Information' in regard to the present position of praedial larceny in the West Indies. With this in view the Governments of the various West Indian Colonies have been asked to assist the Department with copies of any laws now in force or with any documents that may be available, such as Regulations or Instructions recently issued, recent official correspondence on the subject, reports of Commissions or Special Committees appointed within the last ten years, and, also, returns showing the number of convictions for praedial larceny and the number of cases of flogging during the last ten years.

Sales of St. Vincent Cotton in 1904.

The following information is contained in an abstract, supplied by Mr. W. N. Sands, of the account sales of 134 bales of St. Vincent cotton shipped to and sold by the British Cotton-growing Association during 1904:—

Of Sea Island cotton, first quality, 59 bales sold at 14d. to 15½d., and 1 bale at 11½d.; 11 bales of Sea Island cotton, second quality, stained, badly prepared, and mixed, fetched 9d. to 9½d., and 17 sold for 5d. to 8d. The price obtained for 20 bales of Marie Galante was 4d. to 7¾d. per lb. Upland cotton sold as follows: 18 bales at 6.54d. to 6.64d., and 8 bales at 4d. to 5d.

Rivers' Sea Island Cotton Seed.

In reference to the announcement made in the *Agricultural News* of January 28 last (p. 24) in which the Imperial Department of Agriculture offered to obtain a further supply of selected Rivers' Sea Island cotton seed for the use of planters in the West Indies, the following information has been received from the Dill Ball Company, dated Charleston, February 23, 1905:—

We beg to state that we can no longer offer any of the Rivers' or J. T. Dill seed, as both of these parties have withdrawn their seed from the market and it is no longer in our hands for sale.

Under these circumstances, it will not be possible for the Department to undertake to supply any selected Sea Island cotton seed from the United States during the coming season. The planters in the West Indies will, therefore, have to depend on the seed now being harvested, and a careful selection of this will have to be made for continuing the industry on present lines.

In localities where Rivers' seed only was planted last year and where the bushes were maintained in good health and have yielded satisfactory crops, it is recommended that the largest and finest seeds be set aside for planting purposes. Those who are in a position to do so might offer such selected seed for sale to planters in other localities where the conditions have not been so favourable. Special efforts will require to be made to keep the best Sea Island cotton seed pure and free from any admixture of seed of inferior quality.

It is hoped to offer further suggestions in regard to this matter of the selection of pure seed later. In the meantime the utmost care should be taken at the ginneries to keep the best seed entirely separate from the other seed and mark the bags in such a manner as to prevent any mistake being made as to what is 'selected' seed and what is to be passed through the disintegrators for feeding purposes.

Department Publications.

Two pamphlets (nos. 33 and 34) are issued to-day. No. 33 is entitled *Seedling and other Canes in the Leeward Islands, 1903-4*, and contains a summary of the results obtained at the experiment stations at Antigua and St. Kitt's last season. Extracts from this pamphlet are published elsewhere in this issue. The large official report (part 1) on which this summary is based will also be issued in the course of the next few weeks.

Pamphlet 34 is entitled *Notes on Rabbit Keeping in the West Indies*. As has already been mentioned, it contains the notes previously published in the *Agricultural News*, which were specially written by Mr. John Barclay, the Secretary of the Jamaica Agricultural Society.

These pamphlets can be obtained of all Agents of the Department; No. 33, price 4d., post free 5d., and No. 34 at 2d., post free 2½d.

It may also be mentioned that the concluding number of the *West Indian Bulletin*, Vol. V, will probably be issued in time for distribution by next mail. It contains the first instalment of the papers read at the recent West Indian Agricultural Conference.

Raiffeisen Agricultural Banks.

Reference was made in the editorial in the last issue of the *Agricultural News* to the paper read at the recent Conference by the Hon. Wm. Fawcett on 'Raiffeisen Agricultural Banks.'

Mr. Fawcett showed that the all-important feature of this system was the unlimited liability of each and all the members of the bank. This secures, first and foremost, careful selection of all the members, limiting the membership to persons absolutely trustworthy. It also secures good administration—ensuring that the most competent men shall be elected as officers. Without unlimited liability, furthermore, there could not possibly be all that watchfulness and control which keep everything safe.

The whole fabric is built up upon a system of mutual checking, the borrowers being checked by the committee, the committee by the council, the council by the mass of the members—all without offensiveness. The smallness of the district assigned to every bank ensures that knowledge and that vigilance of one another which constitute a *sine qua non* of success.

The organization of the bank is entirely democratic; no office bearer, with the sole exception of the cashier, receives any remuneration. The rules are simple and absolutely intelligible, and the utmost confidence is felt in the security of the bank.

Agriculture in Senegal.

According to the *Consular Report* on Senegal for 1903 recently issued, 'the Agricultural Department has been re-organized and centralized. An Inspector of Agriculture for French West Africa has been appointed, who directs the various experimental gardens in the different colonies, and studies and co-ordinates the results obtained by them.' The cultivation of cotton and rubber is receiving special attention.

The staple of the native varieties of cotton is too short for the European market, and efforts are being made to find long-staple varieties that will thrive in West Africa. Experiments have shown that in certain districts of Senegal good varieties of American cotton will, if properly looked after, give good results.

Excellent rubber exists in many parts of West Africa, but the industry is suffering from overtapping on the part of the natives. Efforts are being made to instruct the natives in proper methods and to cause fresh plantations to be made.

The chief export from Senegal is ground nuts, the total value of the shipments in 1903 being £1,382,983.

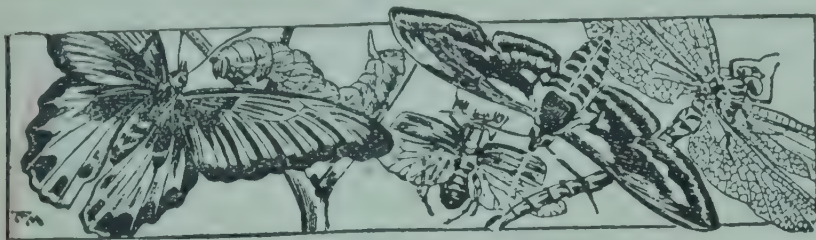
The Government is considering the possibility of establishing a regular irrigation system and is also devoting attention to the matter of re-afforestation. Efforts are also being made towards the extermination of mosquitos.

Agricultural Industries of Grenada.

The cacao industry of Grenada continues to make satisfactory progress. The *Annual Report* on the colony for 1903 gives the following statistics in proof of this: the average annual crop for the five years (1897-1901) was 53,379 bags (of 180 lb.); the crop for the year ending September 30, 1902, was 61,285 bags, and for the following year, 63,019 bags.

'A feature of the year's transactions was the attention paid by purchasers to the finer grades of cacao, which indicates that the greater care necessarily bestowed on preparation in such cases meets with appreciation. Grenada cacao has in the past suffered much in consequence of the absence of such care in the case of cacao grown by small proprietors, and it is hoped that the lesson is gradually being borne in upon them that in this, as in all other business details, success, in these days of competition, can be secured only by painstaking labour.' The fact that the consumption of cacao is rapidly increasing should be encouraging to the cacao-growing islands of the West Indies. It is estimated that the world's consumption of cacao has increased 25 per cent. between 1899 and 1903. In the same period the consumption in the United States has increased from about 315,000 cwt. to 504,000 cwt.

The nutmeg and spice crop shows the same tendency to increase in quantity. The quantity of spices exported during the year was 7,959 cwt. (as against 6,839 cwt. in the previous year), of the value of £31,583, nutmegs forming the bulk of this. Steady increase is shown also in the cultivation of cotton which is the staple product of the island of Carriacou.



INSECT NOTES.

The Arrowroot Worm.

This insect has been known for some time as a pest of arrowroot, cannas, and tous-les-mois. It occurs in most of the British West India Islands, and in St. Vincent, at least, it has been a serious menace to the success of the arrowroot crop in certain seasons, and in other places it is one of the worst of the pests attacking the canna.

In 1900, a serious attack of caterpillars on arrowroot in St. Vincent was reported, and Mr. Maxwell-Lefroy made investigations and suggested methods to be employed against the pest. In 1901, there was another severe attack, but since that time no reports have been received by the Imperial Department of Agriculture of serious outbreaks.

In Barbados the canna is infested at all times of the year by the same insect, and at certain seasons the leaves present a very ragged appearance wherever seen, which is due to the feeding of this caterpillar. The adult of the arrowroot or canna worm (*Calpodus ethlius*) is one of the skippers (family Hesperidae), that group of the Lepidoptera that comes between the butterflies and moths and possesses some of the characteristics of each. It is, however, usually known as a butterfly. *Calpodus ethlius* is brown in colour, with angular white spots on the upper and under sides of the wings. The antennae are slender, situated wide apart on the head, each has a thick knob near the end, and is tipped with a very fine point which is bent or curved to the side. The long hairs on the body and near the base of the wings are reddish brown. The colour is much lighter below than above. The head is broad; the body is stout; the eyes are prominent, hemispherical, dark-brown in colour. The skippers take their name from their quick, darting flight, and this insect flies in the same way, usually keeping near the ground. It feeds on the sweets of many different flowers by means of its proboscis, which is coiled under the head and is hardly noticeable when not in use.

The eggs are laid singly, fastened to the leaves of the food plant. They are greenish-white, $\frac{1}{25}$ inch in diameter. These eggs hatch, producing minute caterpillars which feed on the tissues of the leaf. After a few days' growth the caterpillar bends over the edge of the leaf, and fastens it with threads of silk and then lives within the fold thus formed. The larva is greenish in colour, with a transparent skin. The head is reddish, and the segments just behind the head are much smaller in diameter, giving the caterpillar the appearance of having a large head and small neck. The full-grown larva sometimes measures 2 inches in length. The pupa is formed within the fold of the leaf and is enclosed in a thin cocoon made of a few pale silk hairs which also help to hold it in place. After a few days in the pupa stage the adult emerges and flies away. The butterfly is a day-flyer and may frequently be seen flitting about and visiting flowers.

Several remedies have been proposed from time to time, but the use of poisons, such as Paris green and London purple, seems likely to give the best results. These could be used in the same way as in dealing with the cotton worm.

It is likely that the natural enemies of the arrowroot

insect have a great deal to do with keeping it in check, and it is only when for any reason it gets ahead of the predaceous and parasitic enemies that there is a serious outbreak. In St. Vincent the tick bird (*Crotophaga ani*) is believed to feed on the larvae, and in Barbados the common blackbird (*Quiscalus fortirostris*) has often been observed picking out the larvae from the rolled up or folded leaf.

For several months it has been noticed in Barbados that although plenty of eggs of *Calpodus ethlius* have been conspicuous on leaves of canna, it has been very difficult, sometimes impossible, to find even one caterpillar. This led to the discovery that the eggs are parasitized by a minute insect which eats out the interior, leaving only the empty shell. Sometimes nearly every egg on a plant or in a bed of plants is attacked in this way. It is hoped to publish further notes on this parasite in a future number of the *Agricultural News*.

EPIZOOTIC LYMPHANGITIS.

The Transvaal *Agricultural Journal* (Vol. II, p. 52) contains an article on Epizootic Lymphangitis among horses and mules in that colony, of which a brief summary is given here:—

Epizootic Lymphangitis has appeared in the Transvaal since the war. It has long been known in several countries, viz., France, Southern Italy, Algeria, Dutch Indies, Japan, and India.

There are a number of forms of lymphangitis, but the one under discussion is caused by the presence of a yeast fungus, *Saccharomyces farcinimosus*. The disease first appears in an old wound; then there appears a morbid area in which the original wound may still persist. Some time after this the first appearance of lymphangitis is seen in the swollen lymphatic vessels and tumours, or buds, as they are called, which usually develop into ulcers. The disease appears first on the legs, but may be transferred to the head when the animal rubs the affected parts. Horses and mules are most often affected in the Transvaal, but it is reported in other places in the donkey and the ox.

The disease is communicated by direct contact of healthy with infected animals or through the medium of harness, saddles, brushes, etc., and the first appearance may not be noticed for perhaps two months after the infection occurs. There is no doubt that, when taken early in the course of the disease, cases may be curable, but when the disease is far advanced treatment is rarely successful.

Badly infected animals should be destroyed as they are a source of constant infection. Sick animals should under all circumstances be separated. No articles used in connexion with lymphangitic horses should be used on healthy horses. Stables, etc., should be disinfected as in the case of glanders.

A disease among mules and donkeys, bearing the same name, is known in Barbados, Antigua, Martinique, and Guadeloupe. The Barbados disease, however, presents many points of difference from the description of the Transvaal disease and it may prove to be a different form of lymphangitis.

It is recommended in Barbados that, when pens and stables in which diseased animals have been kept are cleaned out and the manure removed, all animals should be kept out and should not be put back until all the manure is taken out, and the ground and floors sprinkled with lime and covered to a depth of about 1 foot with fresh soil or mould.

AGRICULTURAL SHOW.

Antigua.

The Annual Agricultural Show was held in the grounds of Buxton Grove on Thursday, February, 23.

In the absence of his Excellency Sir C. C. Knollys, the show was opened at noon by Lady Knollys amid a large and representative gathering.

The most striking feature of the exhibition was the uniform excellence of the exhibits sent in, both in the character of the products themselves, and in the manner in which they were shown, in this respect indicating a marked advance on all previous years.

As was the case last year there was a very gratifying display of minor products, notably of garden vegetables, which, considering the serious drought that has prevailed during the past year, were quite remarkable, pointing to careful and intelligent cultivation on the part of the exhibitors, who, it might be added, were largely drawn from the peasant class.

The fruit exhibits, on the other hand, were somewhat below the average, probably on account of the recent drought, for, though careful cultivation and watering might be able to avert the worst effects of drought on vegetables, yet these methods are not applicable to fruit trees.

This year, again, the exhibits of cotton were a feature of the show, a large number of which were sent in, all of exceptional quality; the first prize for seed-cotton was taken by the Hon. R. Warneford, and that for lint by Thibou Jarvis' estate.

In the classes for peasant-grown cotton the number of exhibits was somewhat small, though all that was shown was of excellent quality, and carefully prepared for exhibition, being commendably free from dirt and leaf.

In this connexion an interesting exhibit was shown by the Hon. R. Warneford of tastefully mounted bolls of different varieties of cotton grown by him on Yepton's estate, viz., Upland, Native West Indian, Rivers' Sea Island, Seabrook Sea Island, and Sea Island grown from seed of last year's crop in Antigua, showing well the manner of bolting of each variety.

This year, again, a large variety of meals and starches was shown, a proof of continued interest in what should prove a remunerative industry, if developed.

The school garden exhibit, inaugurated at last year's show, displayed this year a very marked advance both in the number of entries and in the quality of exhibits shown. The exhibits of vegetables under this head were particularly noticeable. Five schools entered for the class, and in every case the plants grown showed discrimination and appreciation of their educational value, and also careful and intelligent cultivation. The first prize in this class was won by the Cathedral school with an admirable exhibit, including Indian corn, beans, ochros, tomatos, squashes, etc. Perhaps the exhibits of school-grown plants in pots and boxes were not quite up to the level of the vegetable exhibits; still, on the whole, they were very fair, and appeared to show that the school teachers had, at any rate in most cases, grasped the value of a growing plant as an object-lesson to a class of children. Possibly there was rather a tendency to grow only those particular plants which require but little care and attention, yet this is natural, considering the newness of the subject. In this class also, the Cathedral school took the first prize, indicating a very good grasp of the requirements of a school garden on the part of the teacher, and an intelligent interest and care in the scholars.

The exhibits in Class 185, for budded and grafted plants from schools, were poor. Among the minor exhibits a good deal of interest and comment was evoked by three large bunches of native-grown celery, a novel departure in agriculture in Antigua, which if persevered in should prove profitable.

Of the live stock exhibits, Mr. H. Goodwin, Government Veterinary Surgeon at Antigua, remarks in a letter to Dr. Watts: 'Particular attention was directed to the presence of a number of fine young mules from different parts of the island. They were as satisfactory a lot as one could desire to see, and with the promise shown compare favourably with recent importations from America.' Of the horses Mr. Goodwin remarks: 'Mr. R. Goodwin's dark-brown gelding and Mr. Cranstoun's chestnut call for special praise.' The exhibits of cattle were, however, not as numerous as in former years.

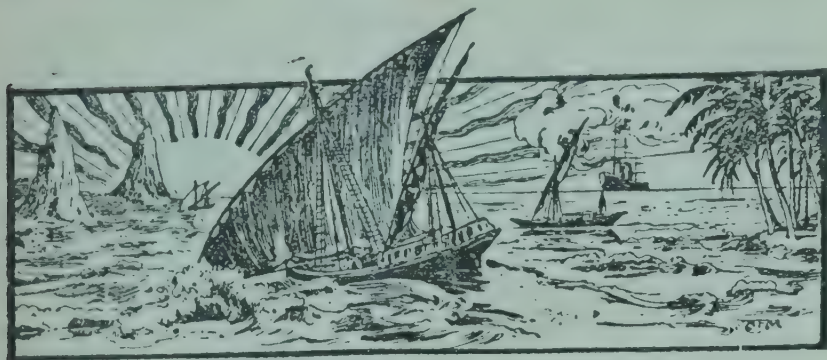
The Departmental exhibits this year included one demonstrating the purity of the Rivers' Sea Island cotton seed imported by the Imperial Department of Agriculture, in which the original seed had been sorted into grades of different degrees of 'fuzziness'; these grades sown separately, and the lint and seed resulting from each sowing ginned and exhibited. The lint from all the grades was of fine quality, conclusively demonstrating the purity of the seed. Other Departmental exhibits included an illuminating lamp burning alcohol instead of kerosene, which was exhibited in view of the recent suggestion to use alcohol instead of kerosene as an illuminant in the West Indies. The Botanic and Experiment Stations were represented by a number of varieties of yams, sweet potatoes, corn, and cotton. Specimens of the large slug, known in Dominica as the Paloute, which had recently been found in Antigua, were also shown, and remedies were suggested.

On the whole, the show this year marks a distinct advance on previous exhibitions; the total number of exhibits, 568, was somewhat smaller than last year, but the general standard of the articles was distinctly higher. The show appears to be having the desired effect in raising the quality of the island produce and in fostering minor industries.

DISC PLOUGHS.

An interesting article in the *Transvaal Agricultural Journal* on the 'Evolution of the Plough' has the following reference to the disc plough which has now come into general use all over the world:—

The disc plough, introduced in quite recent years, is an adoption of the principle of the revolving disc already proved in the disc harrow and disc cultivator, to the work of turning as well as pulverizing the sod. Its ease of draught over the mould-board plough is evident by its rotary motion as against the sliding action, and its peculiar construction, allowing the use of a wheel to take the side thrust, in place of the land side necessary with the mould-board type, which, with the benefits conferred by its fewer parts, and the thorough loosening given to the crown of the sod in turning, probably more than compensate for the narrowness and limited depth of the furrow cut. The width is governed by the diameter of the disc, and the fact of the greater the diameter the greater the resistance experienced to entering the ground, makes a disc of much more than 24 inches with a cut of 6 to 10 inches, unworkable on any but very loose ground. The disc plough of to-day will probably be very much improved in future years, but at the present time it is doubtful if its work has the thoroughness of the mould-board type.



GLEANINGS.

During the past fortnight 114 bales of West Indian cotton have been imported into Great Britain. (*West India Committee Circular.*)

The mean rainfall for the three districts of Montserrat during 1904 was as follows:—Northern and Leeward, 55.24 inches; South, 39.70 inches; and Windward, 33.99 inches.

According to the half-yearly report of the Secretary of the Jamaica Agricultural Society, 4,672 lb. of cotton seed were despatched from the office to 215 persons for planting purposes.

The *West India Committee Circular* of February 14 contains a portrait of the Hon. Francis Watts, C.M.G., D.Sc., and also a reproduction of the photograph of the members of the West Indian Agricultural Conference of 1905.

At the recent Agricultural Show at Trinidad an exhibit of cacao from River estate (under the control of the Botanical Department) obtained the first place in open competition.

Mr. J. H. Hart writes from Trinidad that the applications for seed of the Para rubber tree (*Hevea brasiliensis*) during the past two years have represented ten times the quantity produced in the gardens.

The much-talked-of Agricultural Show which was held at Brown's Town, Jamaica, on February 9, exceeded by a hundredfold in most directions the most sanguine prognostications. (*Gleaner*, February 20.)

At the half-yearly meeting of the Jamaica Agricultural Society a member spoke as follows of the *Journal* of the Society: 'He believed it had a great influence throughout the country and he did not see how that influence could be attained in any other way.'

In concluding his report to the Jamaica Agricultural Society on the West Indian Agricultural Conference, Mr. J. R. Williams said: 'I have returned with greatly increased appreciation of the value of such a meeting and of the value and importance of the Imperial Department of Agriculture.'

Mr. J. C. Lewis, of San Fernando, is the possessor of an orange tree from which was recently picked a most remarkable looking fruit, certainly more like a cross between a lemon and a shaddock than the small ordinary orange that was at the same time plucked from an adjoining twig. The large fruit weighs 27 oz., is 14½ inches in circumference, and 8½ inches from stem to top. (*Port-of-Spain Gazette.*)

Mr. Wm. Clark has been appointed Honorary Corresponding Secretary of the Royal Colonial Institute for the island of Grenada.

It is desirable to announce that it will not be possible to receive further orders for Teneriffe onion seed after to-day, the list having been definitely closed.

The value of the exports of locally grown balata from British Guiana increased from £40,636 in 1902-3 to £45,187 in 1903-4, and of cacao from £2,319 to £3,078. (*Annual Report*, 1903-4.)

At a recent meeting of the Council of the Dominica Agricultural Society, Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, was elected an Honorary Member of the Society.

The London price of Trinidad cacao during 1903-4 varied from 58s. to 69s. per cwt. The price in the previous year was from 58s. to 67s., while the average prices for the last seven years were from 66s. to 72s. per cwt. (*Annual Report* on Trinidad for 1903-4.)

At a meeting of the British Guiana Agricultural and Commercial Society, the President (the Hon. B. Howell Jones), who represented the colony at the recent Agricultural Conference, exhibited specimens of cacao, coffee, lime oil, etc., obtained by him while in Trinidad.

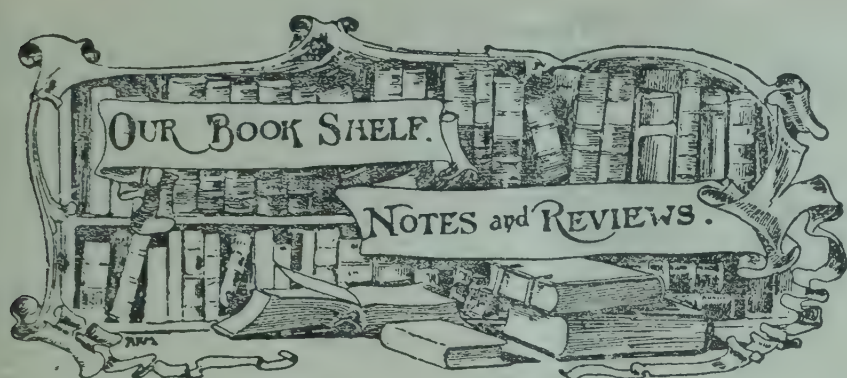
The average output of cotton from Carriacou for the five years 1897-1901 was: raw cotton, 2,095 cwt.; cotton seed, 4,537 cwt. In 1903 the output was 2,688 cwt. of raw cotton and 6,757 cwt. of cotton seed. (*Annual Report* on Grenada for 1903.)

According to the *British Pharmacopœia*, ground nut oil may be employed in making the official liniments, ointments, and plasters, for which olive oil is directed to be used, in India, the African Colonies, Eastern Colonies, and Australasia. The oil used is that obtained, without the aid of heat, from the seeds of *Arachis hypogaea*.

It is desired to correct an error which appeared in the note on the 'Strength of Hardbacks' in the *Agricultural News*, Vol. IV, p. 58. It was stated: 'Physiologists estimate that a man can draw 86 per cent. of his own weight and a horse only 67 per cent. of its weight.' These figures should be 86 per cent. and 67 per cent. respectively.

Hermann Wilfarth, Director of the Agricultural Experiment Station at Bernberg, Germany, died on November 27, 1904. He was associated with Professor H. Hellriegel in the classic investigations on the nitrogen feeding of *Graminæe* and *Leguminosæ* in which the assimilation of the free nitrogen of the air by leguminous plants in symbiosis with root-tubercle bacteria was first clearly demonstrated and explained. (*Experiment Station Record.*)

It is notified for general information that slips of Columbian varieties of cassava will shortly be available for distribution in Barbados. An account of these cassavas is given in the *West Indian Bulletin*, Vol. IV, pp. 74-8, in which Mr. H. H. Cousins states: 'These Columbian varieties are marked by a very high starch content and are practically free from prussic acid.' Applications for cuttings should be made to Mr. J. R. Bovell, Agricultural Superintendent, Barbados.



THE JOURNAL OF AGRICULTURAL SCIENCE,
VOL. I, PART I: Edited by R. H. Biffen, M.A., A. D. Hall, M.A., T. H. Middleton, M.A., and T. B. Wood, M.A.
Cambridge: the University Press. Price 5s.

This is the first issue of a new journal devoted to Agricultural Science. It is explained in the editorial that, in consequence of the establishment of a large number of agricultural colleges in Great Britain and of the employment of experts by the County Councils, there are now a large number of men engaged in scientific work of an agricultural nature—not only in Great Britain, but also in India and the Colonies—who possess no common outlet for the publication of the results of their investigations.

'The journal is thus mainly intended to circulate among agricultural teachers and experts, farmers and land agents having an interest in the scientific side of their profession, agricultural analysts, seedsmen, millers, manure manufacturers, etc., in this and other English-speaking countries.'

The high scientific standing of the members of the editorial staff is in itself an assurance that this journal will contain material of a valuable character and of great interest to workers in agricultural science. We notice that it is proposed to include in its contents 'articles from Indian and Colonial workers descriptive of soil, climate, and other conditions under which agricultural operations are carried on in tropical and semi-tropical countries.'

Among the contents of the first part are 'The influence of Pollination on the development of the Hop,' by Albert Howard; 'Mendel's laws of Inheritance and Wheat Breeding,' by R. H. Biffen; and 'The analysis of the Soil by means of the Plant,' by A. D. Hall.

JAMAICA TOBACCO INDUSTRY.

The following correspondence relating to the development of the tobacco industry of Jamaica is published for general information. It arises out of the report by Mr. F. V. Chalmers which was published in the *Agricultural News* (Vol. III, p. 379):—

Extract from a letter from Professor W. R. Dunstan, Director of the Imperial Institute—to the Under-Secretary of State for the Colonies, dated December 20, 1904.

The trade report made by Mr. Chalmers on the tobacco of Jamaica is of considerable interest.

The fact is already appreciated in this country that Jamaica is able to produce cigars of excellent quality. The quality does not, however, appear to be uniform. The subject is so important that no effort should be spared to take whatever steps are needed for the development of the industry. If the recommendations made by Mr. Chalmers in his report are to be followed, it would seem highly desirable to obtain expert advice with reference to the cultivation, picking, fermentation, and curing of tobacco suitable for the manufacture of cigars. This assistance

could best be obtained from Cuba, or from Sumatra or Florida, where suitable varieties of tobacco are successfully produced.

This step has been recently taken in connexion with the development of the tobacco industry in South Africa and also in Ireland.

Extract from a letter from the Board of Trade Commercial Department (Intelligence Branch)—to the Colonial Secretary, Jamaica, dated December 7, 1904.

In the report from the expert, referred to above, interesting information is (as you are aware) given, embodying the results of his inquiries and investigations into the growing of tobacco in your colony, and the possibility of the establishment of a very lucrative industry in connexion therewith, and there is no doubt that the particulars contained in this report would be of considerable interest to the representatives of the tobacco trade in this country. The value, however, of the information given would be materially enhanced if the report itself were accompanied by samples of the various grades of tobacco produced, and such samples (if procured) could be exhibited at the Offices of this Branch in illustration of Mr. Chalmers' report, and could be retained here for examination by tobacco importers in this country, and afterwards sent to the Imperial Institute, or otherwise disposed of as might be directed.

I should be glad, therefore, if arrangements could be made for samples of such tobacco to be forwarded to this Branch for the purpose indicated.

Extract from Minute from the Director of Public Gardens and Plantations—to the Colonial Secretary, Jamaica.

Professor Dunstan states that Jamaica cigars are not of uniform quality. This fact is due to the trade being at present of only small dimensions, and there is no doubt that the quality will gradually become uniform as larger stocks of tobacco are used for an increased trade.

Expert advice would be of great assistance, as Professor Dunstan suggests, especially as to Sumatra tobacco, when it is possible for the Government to spare the necessary money.

The Department has, however, studied the problems of cultivation and curing with the help of trained Cubans, and has a practical school at Hope Gardens where any one is welcome to come and learn, and where the apprentices are taught during their time of service. The attached leaflets are reprinted from the *Bulletin*, and may perhaps interest Professor Dunstan.

I have sent samples of tobacco to Mr. Worthington [of the Intelligence Branch of the Board of Trade], but I do not think that it is possible to do much at present in an export trade of leaf tobacco. The samples should not, therefore, be put forward as soliciting orders, but only as indicating what Jamaica can produce. All that is now grown is required for the cigar business, which is gradually growing, but large orders might lead again to a catastrophe in our trade. We should aim rather at quality than quantity.

Cotton Exports from the West Indies. During the quarter ended December 31, 1904, 31 bales of cotton were exported from the British West Indies. The total weight was 7,938 lb., and the estimated value £391. The exports comprised 27 bales of Sea Island cotton and 4 bales of Marie Galante. The shipments were all to the United Kingdom. Particulars as to the exports of cotton for the previous quarter were given in the *Agricultural News*, Vol. III, p. 428.

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following report, dated Montreal, February 10, on West Indian produce in Canada:—

The opening month of the year was not marked by any special business features, the annual stock-taking and balances caused a general holding over of new business, and the January record indicates a quiet but steady business. The winter, thus far, has been a normal one, and with the elections all over it is expected that considerable business growth will follow, stimulated also by the large immigration advised from British sources, to take place during the spring.

STEAMSHIP COMMUNICATION.

The tenders for the West India steamship contract are still under the consideration of the steamship companies. The Board of Trade of Toronto and the Corn Exchange of Montreal are in close consultation on the extension of the limits of the contract and the inclusion of Montreal as a terminal port. The Dominion Government is, I understand, seriously reconsidering this latter question, and there is every likelihood of a further declaration being made on the subject at an early date.

SUGAR.

A quiet market exists, and very little business is being transacted. Buyers are holding off and 'bearing' the market, full advantage being taken of the depression of prices on the Beet market. Offers of 3½c. for muscovado, duty paid, have been declined, as well as \$4.40 for 96° centrifugals, duty paid. Yesterday's renewed drop of 3d. in cane sugars in London made buyers firmer in low bids. The cable news to-day, however, of a steadier and firmer market has been most welcome in the interests of West Indian growers. Fifty-five thousand bags of 96° Demeraras are now landing, and a small lot of Argentina is also expected in a few days. Refined sugars, both here and in New York, were marked down 10c. per 100 lb. on the 9th. inst. In the absence of general transactions, quotations must be considered nominal.

MOLASSES.

Our market is bare of all old stock, about 5,000 puncheons having been used up by the refineries during the last month. Offerings have been made from Barbados at 32c. landed, but no sales have as yet been made. Buyers anticipate lower prices and are holding off. Business is normal, and no urgency for buying is apparent, grocery stocks being ample for present requirements.

COCOA-NUTS.

Business continues very quiet and is likely to continue so for another month at least. Prices are easier, with no disposition on the part of buyers to anticipate their wants; future deliveries can barely sustain prices.

COFFEE AND SPICES.

A general weakening of the New York market for futures, though a steady market has been maintained for spot. Buyers at New York bought freely at the decline, and towards the close of yesterday's sales the downward tendency was checked. Locally, prices remain unchanged.

A general slight decline is noticeable in prices in cloves and nutmegs. This, however, may be only temporary and consequent on quiet business. Prices may be considered unchanged.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice market for the month of January:—

After some months of uniform dullness, the drug auctions started the new year on January 19, after an interval of six weeks, with a better tone, which was fairly maintained to the end of the month. The weekly price auctions were resumed on January 4.

GINGER.

At this sale no Jamaica was offered, but good bold Calicut was sold in small quantities at 25s. in baskets. Unassorted Cochin, native cut, was bought in at 35s. to 36s. A week later the same easy tone prevailed. Small to bold native-cut Cochin was bought in at 32s. to 37s. per cwt., while dark wormy rough Malabar sold at 15s. to 15s. 6d. Only small quantities were offered. Jamaica was again absent. On the 17th, 500 packages of Cochin were offered and all were bought in. The prices asked were 22s. for fair medium and plump washed, and 45s. for medium cut and scraped. At the last auction of the month some 1,070 bags of Cochin and Calicut were offered, but only four were disposed of; the prices at which the bulk was bought in were as follows:—unsorted native-cut Cochin 37s. 6d.; Calicut rough 22s., and bold 25s. It will be observed that no Jamaica was offered throughout the month.

ARROWROOT.

Of this article, which is also offered at the spice sales, some 65 barrels of good manufacturing St. Vincent were disposed of at the first auction, on January 4, at 1¾d. per lb. A week later, 100 boxes of Natal were offered and bought in at 3d. per lb., while St. Vincent was sold privately at the previous rates. On the 17th, no St. Vincent was offered, and Natal was bought in at the higher rate of 5½d. At the close of the month 1¾d. was still obtained for St. Vincent, at which rate 387 barrels were sold.

NUTMEGS AND MACE.

Of the former somewhat lower rates were quoted for West Indian than had prevailed at the close of last year, and little or no change took place throughout the month. Mace at the commencement showed an upward tendency, ordinary to fair West Indian selling at 1s. 2d. to 1s. 4d. per lb. and good at 1s. 4d., which rates were continued to the close of the month. No interest seems to have been shown in pimento, 2¾d. being the price quoted for ordinary grey.

SARSAPARILLA.

There is but little to report on this drug. About the middle of the month it was stated that holders of genuine grey Jamaica were asking 1s. 2d. per lb. and for Lima-Jamaica 11d. and 11½d. A little later the following quotations were given, Jamaica being in small supply sold readily at 1s. to 1s. 1d. per lb. Native sold at from 7d. to 9d. for medium dull mixed, and 6d. for sea-damaged. At the end of the month grey Jamaica still commanded 1s. 2d. per lb., but Lima-Jamaica had dropped to 10½d.

KOLA, MUSK SEED, TAMARINDS, ETC.

Amongst other West Indian products may be mentioned a number of packages of kola nuts, of which eight were sold as follows:—One bag of fair Jamaica at 3d. per lb.; one of dull Ceylon at 4d., and six other packages at 4d. to 4¾d. These were offered at the auction on January 18, as was also a barrel of musk seed from St. Lucia, which realized 3½d. per lb. Six barrels of fair palish Barbados tamarinds sold at from 8s. 3d. to 8s. 6d. per cwt., and a quantity of West Indian distilled lime oil fetched 1s. 3d. per lb.

MARKET REPORTS.

London,—January 31, 1905. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co.; February 14, Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 10, 1905; and 'THE PUBLIC LEDGER,' February 4, 1905.

ALOES—Barbados, 15/- to 40/-; Curaçoa, 15/- to 41/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.

BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.

BEES'-WAX—£7 2s. 6d. to £7 10s. per cwt.

CACAO—Trinidad, 56/- to 60/- per cwt.; Grenada, 51/- to 55/- per cwt.; Jamaica, 47/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.

COFFEE—Jamaica, good ordinary, 38/- to 39/- per cwt.

COTTON—West Indian Sea Island, medium fine, 11½d.; fine, 12½d.; extra fine, 14½d. per lb.

FRUIT—

BANANAS—4/- to 6/- per bunch.

ORANGES—6/- to 8/- per case.

PINE-APPLES—St. Michael's, 1/9 to 2/3 each.

FUSTIC—£3 10s. to £4 per ton.

GINGER—Jamaica, ordinary to good ordinary, 29/- to 30/-; low middling to middling, 35/- to 37/- per cwt.

HONEY—Jamaica, 14/6 to 23/- per cwt.

ISINGLASS—West Indian lump, 2/3 to 2/9; cake, 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 10d. per gallon; concentrated, £13 15s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/3 per lb.

LOGWOOD—£4 2s. 6d. to £5; Roots, £4 to £4 10s. per ton.

MACE—Fair to good pale, 1/4 to 1/5; reddish, 1/3; per lb.

NITRATE OF SODA—Agricultural, £11 5s. per ton.

NUTMEGS—88's, 9½d.; 104's, 6½d. to 7d.; 116's, 6d. per lb.

PIMENTO—2½d. per lb.

RUM—Demerara, 1s. 2d. to 1s. 4d. per proof gallon; Jamaica, 2s. per proof gallon.

SARSAPARILLA—7½d. to 1/2 per lb.

SUGAR—Yellow crystals, 23/- per cwt.; Muscovado, 18/- to 19/- per cwt.; Molasses, 16/- to 19/- per cwt.

SULPHATE OF AMMONIA—£13 10s. per ton.

Montreal,—February 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 9c. to 9½c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 28c. to 30c.; Antigua, 23c. to 25c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5½c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.65 to \$3.75 per 100 lb.

—Muscovados, 89°, \$2.90 to \$3.00 per 100 lb.

—Molasses, 89°, \$2.65 to \$3.75 per 100 lb.

—Barbados, 89°. No Quotations.

New York,—February 17, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11½c.; Trinidad, 12c. to 12½c. Jamaica, 9½c. per lb.

COCOA-NUTS—Trinidads, \$30.00 to \$32.00 per M., selected; Jamaicas, \$32.00 to \$34.00 per M.

COFFEE—Jamaicas, 8½c. per lb. (ex store).

GINGER—Jamaica, 5½c. to 5½c. per lb.

GOAT SKINS—Jamaicas, 57c. per lb.

GRAPE FRUIT—Jamaicas, \$4.00 to \$5.00 per barrel.

ORANGES—Jamaica, \$3.00 to \$4.00 per barrel (stem cut).

PIMENTO—4½c. to 4½c. per lb.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4½c.; Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—February 25, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$10.00 to \$10.50 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.50 to \$12.00 per 100 lb.

HAY—90c. to 95c. per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorf's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00.

MOLASSES—20c. per gallon.

ONIONS—Lisbon (stringed), \$3.75 per 100 lb.

POTATOS—ENGLISH, \$2.30 to \$2.40 per 160 lb. (retail).

RICE—Ballam, \$4.75 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR—Muscovados, 89°, \$2.90; Dark crystals, 96°, \$3.40 per 100 lb.

British Guiana,—February 23, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$6.50 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14½c. to 15c. per lb. (retail).

—Creole, 12c. to 14c. per lb.

DHAL—\$4.50 per bag of 168 lb.

EDDOES—\$1.68 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Madeira, 3½c. to 4c.; Lisbon, 4½c.; Garlic 6c. to 6½c. per lb.

PEA NUTS—American, 6c. per lb. (retail).

PLANTAINS—24c. to 48c. per bunch.

POTATOS—ENGLISH, Picked, \$2.50 to \$2.75 per barrel.

RICE—Ballam, \$4.30 to \$4.35 per 177 lb.; Creole, \$4.15 per bag.

SWEET POTATOS—Barbados, \$1.44 per bag; \$1.56 per barrel.

TANNIAS—\$2.16 per barrel.

YAMS—White, \$1.68 per bag.

SUGAR—Dark crystals, \$3.70 to \$3.75; Yellow, \$4.25; White, \$4.90 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—February 23, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$12.00; Estates, \$12.10 to \$12.25; Venezuelan, \$12.25 to \$12.50 per fanega (110 lb.).

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 8½c. to 8½c. per lb.

COPRA—\$3.10 per 100 lb.

MOLASSES—20c. per gallon.

ONIONS—Lisbon, \$3.50 per 100 lb. (retail).

POTATOS—ENGLISH, \$1.25 to \$1.30 per 100 lb.

RICE—Yellow, \$4.30 to \$4.40; White Table, \$4.75 to \$5.75 per bag.

SUGAR—Yellow crystals, \$4.00; bright molasses sugars, \$3.00 to \$3.25 per 100 lb.

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Agricultural Shows, 1904-5.

THE series of Agricultural Shows held in the West Indies for the season 1904-5 has come to a close with the interesting show that took place at Grenada on March 16 and 17 last.

The highest position in regard to Agricultural Shows in this part of the world is undoubtedly held by Jamaica, where the shows are not only well organized and uniformly successful, but where the results bear directly on the requirements and circumstances of the people. During the year 1904 seven Agricultural Shows were held in Jamaica as follows: Savanna-la-Mar, January 1; Mount James, June 30; Port Royal Mountains, July 6; Hanover, July 26; St. Ann's, August 1; New-market (St. Elizabeth), August 1, and Kendal, November 23. The grants-in-aid made by the Agricultural Society, amounting to £260, were largely supplemented by local contributions, and valuable assistance was afforded by the Agricultural Instructors and other officers connected with the agricultural services in the island.

At British Guiana exhibitions were held during the official year 1903-4 by the Farming Association at Buxton, East Coast, and at Georgetown for the county of Demerara. The prizes offered from the grants made by the Board of Agriculture 'were only for articles exhibited in fair quantity and which are either of actual or potential commercial value.' Farmer Competitions took place in the Victoria Belfield district, the Georgetown district (for market gardeners and farmers) and in the island of Wakenaam.

In the colony of Trinidad very successful School Vegetable Shows in connexion with school gardens were held at Couva on November 25, at Tunapuna on November 28, and at Princes' Town on December 2, 1904. The funds for prizes were provided by the

Education Department. Additional prizes offered for general competition were contributed by the Agricultural Society and from private sources. Mr. J. H. Collens, the Inspector of Schools, and Professor Carmody took an active part in organizing these shows. The fourth large Agricultural Show held in Princes' Building, Port-of-Spain, since 1895 was opened by the Governor (Sir Henry M. Jackson, K.C.M.G.) on February 15, 1905. This was described as 'one of the finest and most satisfactory all-round exhibitions of the series yet seen there.' It lasted for four days and at the close it was arranged to hold a sale of the exhibits.

At Barbados and in the Windward and Leeward Islands successful Agricultural Shows have also been held. The Annual Industrial Exhibition and Show of Stock held at Harrison College under the auspices of the Barbados General Agricultural Society took place on December 20, 1904. The Local Agricultural Exhibition for peasant proprietors and tenants on sugar estates organized by the Imperial Department of Agriculture was opened by the Governor (Sir Gilbert Carter, K.C.M.G.) at Dunscombe Plantation on January 24, 1905. This was regarded as 'the best that has yet been held.' The exhibits sent from the Elementary Schools constituted a prominent feature of this show. Another interesting event was the distribution of prizes among the best-cared-for donkeys belonging to peasants.

In the Leeward Islands Agricultural Shows have been taken up with considerable energy. The first of the series in 1905 held at Dominica was opened by the Administrator (Mr. H. Hesketh Bell, C.M.G.) on February 23 and 24 in the Botanic Gardens at Roseau. This was not so large as former shows; but the exhibits were of an interesting character and afforded striking evidence of the variety and value of the products of this fertile island.

The Montserrat Show was held on February 24. The Governor (Sir Courtenay Knollys, K.C.M.G.) was present and expressed himself delighted with the exhibits.

A full account of the Agricultural Show opened at Antigua by Lady Knollys on February 23 has already appeared in the *Agricultural News* (Vol. IV, p. 75). 'There was a distinct advance on previous shows and the general standard of the exhibits was higher.'

The first Agricultural Show held at Nevis for many years was opened in that island by the Adminis-

trator (Mr. Robert Bromley) on February 28. Very successful arrangements for the show were made by the local Agricultural Society under the direction of Mr. C. A. Shand, the Resident Magistrate.

The second Agricultural Show at St. Vincent was opened by the Administrator (Mr. E. J. Cameron) on March 9. The entries of stock (115) were specially good: coffee and cacao were well represented; and eighteen samples of Sea Island cotton were entered for competition.

An Agricultural, Industrial, and Horticultural Exhibition, held at the Queen's Park, St. George's, Grenada, on March 16 and 17, was opened by the Governor (Sir Robert Llewelyn, K.C.M.G.). The total amount offered in Prizes was £122, with a silver cup and £5 for special prizes by the Governor. The stock exhibited by peasant proprietors was of special merit. In other respects the Grenada Show was regarded as not quite so successful as some of its predecessors.

As the Agricultural Shows held at Barbados, Dominica, Montserrat, Nevis, St. Vincent, and Grenada were held under the auspices of, and received assistance from, the Imperial Department of Agriculture, Sir Daniel Morris was present and distributed the 'Diplomas of Merit' awarded by the Department. He also gave addresses advocating the educational influence of the shows and recommending hearty co-operation among large and small cultivators especially in districts not hitherto represented.

Sir Daniel was unable to be present at the interesting show held at Antigua (also under the auspices of the Imperial Department of Agriculture) owing to the date clashing with those in the other islands. The general impression left on the mind of the Imperial Commissioner, after visiting the several shows above referred to, is that they are capable of being rendered a valuable means of infusing new interest and energy into the agricultural life of the people in these colonies and that they deserve the warm support of all classes of the community.

It is hoped that exhibits from Elementary Schools will increase year by year. It is also hoped that the judges at these shows will endeavour to raise the standard of excellence and award prizes in such a manner as to afford special encouragement to those who devote attention to growing commercial produce of good quality and are successful in presenting it in a skilful and attractive manner.



SUGAR INDUSTRY.

Seedling Canes in Jamaica.

In an account of the proposed extension of the sugar-cane experimental work in Jamaica the *Gleaner* has the following reference to the cultivation of seedling canes:—

The Sugar Department has charge of the seedling canes which are grown at Hope for experimental purposes, and Mr. Cousins informed our representative that the best seedling cane grown there this year was B. 208. Over an acre has been planted in this variety. This cane has done splendidly in the dry districts of St. James and Trelawny, and Mr. Cousins was of opinion that that variety was the best for Jamaica as far as he had been able to judge.

Over 30,000 selected tops have been sent out from the experimental plots, and Mr. Cousins hopes that planters will put a considerable acreage under cultivation of seedling canes and so increase their yields.

West Indian Seedling Canes.

The following article on seedling sugar-canes appeared in the *Louisiana Planter* of February 18:—

At the recent West Indian Agricultural Conference it was brought out in debate by Sir Daniel Morris, the Imperial Commissioner of Agriculture, that our British cousins in the West Indies, in their desire to improve their cane culture, were rapidly utilizing the improved seedling sugar-canes until it is now found that in British Guiana alone there are some 13,000 acres planted in the newer varieties, and in the island of Antigua 8,000, with considerable quantities in the other islands. It is well for us to consider this in connexion with our own experiments here in Louisiana with Demerara seedlings Nos. 74 and 95, which promise so much success in this state as new varieties. Our Sugar Experiment Station has already demonstrated the value of these canes from experiments carried on during a series of years, and at the next meeting of the Louisiana Sugar Planters' Association the industrial side of the question will be brought up and carefully considered. Many of our planters have produced large fields of these canes and the reported results are generally very satisfactory. Prof. Blouin, at Audubon Park is now collating all the data that he can secure, and all the sugar planters of the state who have been experimenting with these canes are urgently asked to send in to Professor Blouin such data as they may have, so that from the data such general information may be secured as will be advantageous for every one connected with the sugar industry.

We are sometimes disposed to think that our British West Indian *confrères* are a little slow in their sugar methods, and yet investigations have always shown that for decades the sugar planters of Barbados led the world, so far as excellence in cane culture was concerned; and the sugar planters of British Guiana led the world so far as excellence in the manufacture of sugar was concerned. If we are to maintain our leadership in the cane sugar industry, so far as its advancement along scientific lines is concerned, we shall need to be especially enterprising in the matter of our

experimentation and ascertainment of the merits of seedling canes.

If D. 74 and D. 95 canes are better than our standard purple or striped canes, we should ascertain the facts, and if good judgement indicates such a line of action, we should go into the new canes and let the old varieties become obsolete.

RABBIT KEEPING.

The Movable Hutch.

The following description of the movable hutch, known as the Morant system, is extracted from the *Senior Country Reader, III*. * This system is recommended as likely to give the best results:—

If you have a piece of grass that is doing next to nothing, the herbage of which is a bit coarse, place on it movable rabbit hutches.

These movable hutches have a small closed-in sleeping or breeding compartment at one end, and a hole through the partition of the sleeping place leads into a larger run. The run has small-meshed wire fixed along the bottom, small enough to prevent the rabbit getting its legs through it, but



FIG. 5. MOVABLE HUTCH.

[From *Senior Country Reader, III*.]

large enough to allow the herbage to come through the meshes of the wire.

The hutch opens with a lid at the top. It has two handles, one at either end, so that to move it you lift up one end of the hutch by the handle and place the wire bottom on a fresh piece of grass, and having done this lift the other end by the handle till the whole hutch is placed upon a fresh piece of ground.

The hutches are very light so that a small child can move them about. They should be moved three times a day.

Further details as to the management of rabbits upon this system will be found in the *Agricultural News* (Vol. III, p. 118).

It will be remembered that this system is cordially commended to rabbit keepers in the West Indies by Mr. John Barclay in the pamphlet (no. 34) recently issued by this Department, entitled *Notes on Rabbit Keeping in the West Indies*.

Senior Country Reader, III; by H. B. M. Buchanan, B.A., London: Macmillan & Co., Ltd. 1904.



WEST INDIAN FRUIT.

BARBADOS BANANAS.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture by Messrs. W. Pink & Sons relative to Barbados bananas:—

Sales are much better now, and the account sales which are going out by this mail show an increase in net remittance of just over 1*d.* per bunch.

I have just received a cable from Barbados to the effect that 1,250 crates are on the way to us. This increase in quantity is most satisfactory. You will be glad to know that we have not had a single bunch chilled at Plymouth this winter, but a few which came through Southampton to Portsmouth were chilled. I think that this shows that the method of landing in large decked lighters is satisfactory. The two boats which we are now using will land 3,000 crates under decks.

COLONIAL FRUIT EXHIBITIONS.

The following note is extracted from the report of the Royal Horticultural Society read at the 101st. annual meeting on February 14 last:—

One new departure in regard to the exhibits has already been made, and that is the exhibition of colonial fruit. The exhibition we had during the winter was organized at very short notice, and we hope in future that we shall have a much more complete and more interesting exhibition than on that occasion. The next show of colonial fruits will take place on March 30 and 31, and we have every reason to believe that the colonies will make a very considerable show, as they can do. Not only is the matter of interest to fruit-growers, but it is a very important element in the food supply of the people. Through our colonies we can get, almost throughout the year, fruit and vegetables which conduce so much to the health of the people without having to wait for the seasons to come round.

PIMENTO IN JAMAICA.

The following note on pimento is taken from the *Annual Report* on Jamaica for 1903-4. Interesting remarks are made on the fluctuations of the price of this product on the market:—

Pimento is an article for which there is a limited demand. Jamaica is the sole source of supply. The average output is large enough to depress continuously the market. It will be observed that last year's short crop is estimated to have been very nearly as valuable as the

previous year's crop, which exceeded it by more than 60 per cent. in quantity. The price was unduly inflated after the cyclone by exaggerated reports of the destruction of the pimento walks. As was the case in regard to cocoa-nut plantations, many large pimento properties, especially in St. Ann's, where the edge of the limestone tableland caught the full force of the hurricane, showed extraordinary devastation, but the impression I received from travelling through the island during the autumn was that there was a very imposing number of pimento trees left standing in St. Ann's, and that outside St. Ann's the reduction was not at all serious, in short that there were probably, on the whole, quite enough bearing pimento trees left in the island to yield as large an average crop as it is economically advantageous should come on the market. The hurricane appeared to me to have done what the Dutch used to do for their spice crop when they controlled the market for cloves, pepper, and cinnamon, and what has been done for the diamond market.

IRISH POTATOS IN JAMAICA.

We extract the following from the *Journal of the Jamaica Agricultural Society*:—

We have ordered 50 barrels of seed potatoes to the order of members for the spring planting in March. Never at any time have there been more seed potatoes brought to this island than this last season, and local markets should be well supplied during the period when there are no foreign potatoes, between May and October. This is what we should aim at, because between October and May Halifax potatoes can be landed here more cheaply than we can grow them, because the return, when planted here at that time, is not usually large enough at high elevations where it is cold, where potatoes do best in summer. Successful crops may be raised in the lowlands where seasons are favourable by planting in November. What growers have to watch well is the careful marketing of the crop. The small people, as a rule, dig all their potatoes and take them to market at once, and for a month there may be a glut in the local markets, and then for many months no potatoes at all. Large crops will likely be ready in June and July, and good profits may be made by the careful manipulation of the markets through a combination of growers, to place only so many potatoes in the market each week, and so keep up the demand and the price. We shall soon be able to collect good reliable data from actual experience as to the best methods of treatment of seed and soil in different districts.

COTTON INDUSTRY.

Shipment of Cotton.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture by the Chairman of the Royal Mail Steam Packet Co.:—

In view of the fall in the price of cotton, and with a view to assist the industry in its initial stages, I have decided to reduce the freight on cotton from the British West Indies to Southampton, London, Liverpool, or Manchester, including charges to destination, from 17s. 6d. per ton measurement to 15s. per ton measurement; reduction to take place at once.

I trust this may be of some little help to the growers in the West Indies.

Sea Island Cotton Market.

We extract the following from the Sea Island report, dated Charleston, March 4, of Messrs. Henry W. Frost & Co.:—

There has been a good demand for export for the limited offerings of 'Tinged Stains' which factors would consent to sell at 12c. to 15c., resulting in sales of about 100 bales; besides, two Planter's Crop Lots have been sold for France at 28c.

Otherwise the market is quiet, with some demand for crop lots at 23c. to 24c., which factors are refusing to sell under 25c.

We quote stained and tinged, 12c. to 17c.; fine, 20c.; fully fine, 23c. to 24c.; extra fine, 25c. to 26c.; extra-fine crop lots, 26c. to 28c.; extra-extra-fine crop lots at 48c.

Cotton Traffic Ordinance in St. Kitt's-Nevis.

An Ordinance has been passed by the Legislative Council of St. Kitt's-Nevis which is designed to regulate the local sale and purchase of cotton. Among its provisions are the following:—

No person shall sell any cotton in the presidency without having first obtained a license to do so in accordance with the provisions of the Ordinance. The applicant for a 'License to sell' must state the acreage planted and the situation of the land from which the cotton is to be gathered and give a fair estimate of the weight of seed-cotton to be gathered.

No person shall purchase any cotton in the presidency without having first obtained a license to do so. Every person who has obtained a 'License to purchase' must keep a book in which he shall enter particulars of each purchase. The holder of such a license must afford the Inspector of Police every assistance in detecting any larceny or illicit trading in cotton.

All persons selling or purchasing cotton without having first obtained a license, or selling to or purchasing from persons not licensed under this Ordinance, or holders of licenses failing to comply with the provisions of the Ordinance, shall be liable on conviction to a penalty not exceeding £50, or six months' imprisonment with or without hard labour.

Reference was made in the *Agricultural News* (Vol. III, p. 332) to a similar Ordinance in force in St. Vincent; another is in force at Barbados.

Sales of West Indian Cotton.

The following extract from a recent speech of Mr. J. A. Hutton, Vice-Chairman of the British Cotton-growing Association, indicates that West Indian Sea Island cotton is establishing for itself a satisfactory position on the English market:—

What the Association had done in the West Indies alone had fully justified its existence. They received from that source 5,000 bags of 360 lb. each. Cotton had recently been shipped from Barbados which had sold at something like 2d. per lb. over the best price of similar cotton grown in America. So far as Sea Island cotton was concerned, therefore, they could hold their own with America, for the growing of Sea Island cotton in the West Indies was now established.

The *West India Committee Circular* says:—

We learn that in Manchester the feeling in favour of West Indian Sea Island cotton is becoming more and more marked, and it is thought that it will beat American Sea Island out of the market.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop:—

Seventy-five bales of Sea Island cotton were shipped from the Central Cotton Factory at Antigua on March 8 to the British Cotton-growing Association.

Mr. Fishlock states that in the Virgin Islands the prospects of the crop are favourable in spite of the dry season which has caused the plants to be somewhat stunted.

In St. Kitt's the cotton is now practically all reaped. In that island most of the cotton has been planted on land intended for planting cane this season. As stated by Mr. Shepherd: 'This is an experiment in planting cotton early as a catch crop, and it will be interesting to note the effect on the cane crop following it. The land was prepared as for cane, and the cotton planted at a distance of 5 feet by 4 feet.'

In further reference to the prospects of cotton growing in St. Kitt's-Nevis we may quote from a letter addressed to the Imperial Commissioner of Agriculture by the Administrator:—

From all I have heard the cotton crop here seems to have come up to expectations. There has, I regret to say, been a great deal of cotton stealing, especially in Nevis, but an Act was passed through the Council last Tuesday which, I hope, will put a stop to it.

RICE INDUSTRY IN THE UNITED STATES.

In a recently issued *Consular Report* on the above subject (Miscellaneous, No. 625) it is stated:—

Rice cultivation in the United States has become an important industry. During the fiscal year 1898-9 the production of rice in this country was 250,280,221 lb., the land under cultivation was 342,218 acres. This year it is calculated that the yield will be about 470,000,000 lb., the land planted with rice being 643,400 acres.

Notwithstanding this large increase, it is still insufficient to meet the home demand. The quantity of rice of all sorts imported during the fiscal year amounted to 154,221,772 lb., chiefly through San Francisco and New York.

EDUCATIONAL.

Harrison College, Barbados.

The following is the report of the examiner appointed by the Cambridge Syndicate to examine the science classes at Harrison College, Barbados:—

Three papers were set on schedules supplied by the College, namely, in Physics, Agricultural Chemistry, and Practical Chemistry.

Physics.—The subjects in the Physics schedule included Heat, Light, and Meteorology, and questions were set on each of these subjects. The answers were, on the whole, excellent, and only one boy has failed to get a grip of the work.

All the questions were well answered with one exception, an easy and straight-forward question on the measurement of quantities of heat, which was practically not touched by any candidate.

Agricultural Chemistry.—No papers were received from two candidates who sent up papers in the other two subjects. The work of the seven boys who sent in papers was strikingly uniform and good. Two parts of questions were generally badly answered, one relating to the conversion of nitrate nitrogen into ammonia, the other to the common impurities in commercial nitrate of soda.

Practical Chemistry.—The schedule (for one year's work only) in this subject was restricted to the preparation of a few substances of agricultural interest, and the qualitative examination of simple salts for specified acids and bases.

Three simple salts were set for the examination, as it is impracticable to convey preparations from Barbados for inspection by the examiner. The three salts were identified by every one, though a few of the candidates did not describe their experiments quite satisfactorily.

On the whole, the results of the examination are most satisfactory and give evidence of careful and thorough teaching.

Agricultural Science at Harrison College.

The following is the report of the examiner (Dr. H. H. Cousins, Government Analytical and Agricultural Chemist, Jamaica) on the results of the examination in Agricultural Science at Harrison College:—

Papers were received from seven candidates upon each of three subjects: (a) Cane Planting, (b) Sugar Manufacture, (c) Practical Sugar Chemistry. The work was remarkably even throughout, and there was very little difference in the work presented by the first six candidates. The questions on the ideal sugar-cane, the moth borer, and the fungoid diseases of cane were well treated, and the latest results of the Imperial Department of Agriculture had evidently been clearly impressed. A high standard was attained in this paper by six candidates.

The answers to the paper on sugar manufacture were of unequal merit. The subject had evidently been efficiently taught, since every question was well treated by some of the candidates. The practical details of the hydraulic mill attachment and of the triple effect were confused by some, while clearly explained by others. I consider the results shown on this paper to be very creditable. The practical paper was marked upon a strictly technical basis, no credit being given for results involving errors beyond the limits of

ordinary technical laboratory work. On the whole, very good work with the polariscope was obtained.

The alcohol determination was not correctly made by a single candidate. This may have been due to the use of an uncorrected Tralles hydrometer. I have found it desirable with my students to employ the specific gravity bottle instead of the hydrometer for this purpose. I am satisfied that these candidates have not only been taught well, but have had enough practice in practical sugar chemistry to make them reliable workers capable of carrying out ordinary chemical control in sugar works.

RAINFALL RETURNS.

Antigua.

The Hon. F. Watts, Government Chemist and Superintendent of Agriculture for the Leeward Islands has forwarded rainfall returns for Antigua for 1904, from which we extract the following:—

The average monthly rainfall for 1904 (mean of seventy stations) was as follows:—

January	...	...	3.29	inches.
February	...	...	1.83	"
March	...	...	1.52	"
April	...	...	2.14	"
May	...	...	0.92	"
June	...	...	1.12	"
July	...	...	1.53	"
August	...	...	6.38	"
September	...	...	5.34	"
October	...	...	5.16	"
November	...	...	5.50	"
December	...	...	1.68	"

Total ... 37.01 "

The average annual rainfall for thirty-one years (1874-1904) was 46.03, so that the rainfall for 1904 was 9.02 inches below the average.

St. Lucia.

From the St. Lucia *Official Gazette* we extract the following information with regard to the rainfall for 1904:—

The monthly rainfall at the Botanic Station (height above sea-level, 10 feet) was as follows:—

January	...	...	8.54	inches.
February	...	...	4.83	"
March	...	...	3.55	"
April	...	...	2.09	"
May	...	...	6.35	"
June	...	...	6.59	"
July	...	...	8.32	"
August	...	...	9.19	"
September	...	...	8.35	"
October	...	...	9.83	"
November	...	...	6.10	"
December	...	...	3.98	"

Total ... 77.72 "

In the previous year the rainfall at the Botanic Station was 86.84 inches, and in 1902, 91.43 inches.

The total rainfall for the year at other observation stations was: Agricultural School, 75.52; Rivière Dorée, 57.09; Errard, 74.86; and Soufrière, 95.03.

BOTANIC STATIONS.

Dominica.

As showing the superiority of budded over seedling citrus trees it may be mentioned that at the Dominica Botanic Station in 1899 a number of sour orange stocks were budded into the triumph grape fruit. Five of these were planted in the gardens as specimen trees and all were in bearing in three years. This season the best tree gave a crop of 300 fine grape fruits, and another gave over 200. A seedling grape fruit would not have commenced to bear in this time, and the quality of the fruit would be uncertain.

The number of budded plants on order at the Botanic Station, Dominica, is over 4,000. These, at 6d. per plant, represent a value of over £100.

St. Kitt's.

Efforts are being made, and so far with some success, to establish a number of rockeries in the Botanic Station at St. Kitt's with succulent plants. The plants chiefly used for this purpose are 'Turk's Cap' (*Melocactus communis*), *Aloe vulgaris*, and others obtained from the hillsides in some of the drier parts of the island.

The Agricultural Superintendent (Mr. Shepherd) would be glad to receive succulent plants other than those mentioned above from the other Botanic Stations. He would exchange with 'Turk's Cap' and other St. Kitt's plants.

A number of plants of *Saccharum ciliare*, raised from seed received through the Imperial Department of Agriculture from India in May last, are growing at the Botanic Station, St. Kitt's. These plants, which are now arrowing, appear to withstand drought well, and trials are being made to test their usefulness for fodder purposes. This species may also be suitable for forming ornamental clumps on lawns, similar to Pampas grass.

St. Lucia.

The following extracts are taken from the *Annual Report* on St. Lucia for 1903:—

Most of the experimental work formerly carried on at the Botanic Station has been transferred to the Agricultural School at Union, which was opened in 1901. The station, however, still provides a pleasant place of resort for the people of Castries and visitors to the colony, and its useful features in a practical direction have not been entirely superseded by the institution at Union, as evidenced by the fact that during 1903 economic plants to a number over 10,000 were either sold at, exchanged, or issued free of charge from, the station, as were over 2,000 decorative plants and cuttings.

Cacao, cotton, and other experiment stations are situated at Rivière Dorée; La Perle estate, Soufrière; St. Joseph estate, Dennery; Bellair estate, Roseau; and Entrepôt estate, Castries. The cultivation consists of cotton, limes, pine-apples, etc., on the first-named plot, and of cacao on the remainder.

The Agricultural Instructor reports that the cultural and manurial methods employed in these plots are being largely followed by both large and small proprietors, with increasingly satisfactory results, and while three years ago only one or two planters ventured to disturb their cacao roots with a fork, now thorough and deep tilth has become a recognized operation; while artificial manures are known, used, and thoroughly appreciated, and pruning and draining are constantly practised, not in the former ignorant fashion, but on intelligent lines.

HOW TO GROW CANNAS.

Mr. John Belling, B.Sc., Agricultural and Science Master at St. Kitt's, has forwarded the following notes on the growing of cannas:—

The Crozy cannas and the new large-flowered cannas lately obtained by crossing the American *C. flaccida* with the dwarf Crozy cannas are perhaps the most popular plants in the United States for ornamental purposes. The canna is quite at home in the West Indies, several members of the genus being native. Here it grows right on throughout the year, and we are saved the trouble of preserving pieces of the rhizome during the winter. Yet comparatively few gardens have a good display of this flower. Canna 'roots' or rhizomes may be obtained from the American florists at from 10c. to 15c. for choice varieties, and travel very well if sufficient air is allowed in the package to keep off mould. The best time to get them is November. Good varieties are: (Red) Duke of Marlboro, President McKinley, Pennsylvania, Black Prince; (Yellowish red) America; (Pink) Martha Washington; (Red or striped) Governor Roosevelt; (Red and Yellow) Mrs. Kate Grey, Alemannia, Souvenir d'Antoine Crozy, Queen Charlotte; (Yellow) Buttercup; (White) Alsace, Mont Blanc.

When the parcel is received the pieces should be well washed, and rotten portions cut out, to remove mould, and planted in sandy soil in boxes or pots. The canna is a surface feeder and requires abundance of food, so that plenty of pen-manure, wood-ashes, or other manures should be worked into the top soil of the bed where the cannas are to grow. As they flower best in a sunny place, a thick mulch of leaves, old megass, or pen-manure should be kept upon the surface. Shelter from the wind is imperative for good blossoms. When the pieces of rhizome have grown leaves about 6 inches high, they should be set out leaving a depression around each (like a cane-hole) to hold water, if the soil is porous. Plenty of water should be supplied, in fact, some of them will grow as semi-aquatics in the wet soil at the edge of a pond.

When a spray has finished flowering it should be cut off so that the plant may not waste its nutrient sap in forming seed-vessels and seeds. Also, when a stem has opened all its blossoms it should be cut out with *all* its leaves. This lets in light to the other stems, removes rusty leaves (a source of infection), and helps to keep down caterpillars. If the canna worm attacks the plant, as in St. Kitt's, the white eggs should be picked from the young plants every other day till they are large and the caterpillars removed regularly from the older plants. The moths themselves can be caught while egg-laying.

About Christmas the cannas should be dug up, the stems removed, and the mass of rhizomes divided. The bed should be re-manured and re-planted. A spider frequents the plants here and feeds on the small caterpillars so that it should not be destroyed.

If anyone in the West Indies were desirous of following the example of the tuberose growers of the S. E. States, or the lily growers of Bermuda, he would find the canna a most promising plant. Roots obtained from the States in May gave each thirty or forty times as many plants at Christmas. If choice varieties were planted, fresh roots could be sent to New York in April and would be far superior to those which had been stored for five months and are wholly or in part dry or rotten.

An account of the canna worm, to which Mr. Belling refers will be found on p. 74 of this volume of the *Agricultural News*.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 95 of this issue.

The Agricultural News: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with some of the aspects of the Agricultural Shows that have recently been held throughout the West Indies.

Notes on the sugar industry relate to the cultivation of seedling canes in Jamaica, and to the raising of seedling canes in the West Indies.

Several interesting notes with regard to the cotton industry will be found on p. 85; of special interest to planters is the note on the sales of West Indian cotton in England.

Reports on the examination of the science and agricultural classes at Harrison College, Barbados, are published on p. 86. It will be seen that the examiners are very favourably impressed with the character of the work presented by the boys.

A summary of an address delivered by Sir Daniel Morris before the St. Lucia Agricultural Society is published on p. 87.

An illustrated article on the Corn Ear Worm, a common pest in the West Indies, will be found on p. 90.

An interesting trade report on orange and citron peels, which has been prepared by Mr. J. R. Jackson at the request of the Imperial Commissioner of Agriculture, appears on p. 93. Mr. Jackson discusses the possibility of the English market being supplied with this product by the West Indies.

Jamaica Prison Farm.

In further reference to the successful establishment of a farm at the Spanish Town prison in Jamaica, of which mention was made in the *Agricultural News*, Vol. III, p. 20, the following information may be of interest:—

During the year ended March 31, 1904, the amount expended on the farm, exclusive of prison labour, was £342 2s. 7d.; the actual value of the crops reaped was £608 17s. 4d.

The principal crops were: potatoes, 64,053 lb.; yams, 13,424 lb.; pumpkins, 7,755 lb., and miscellaneous vegetables in varying quantities. The grass cut realized £123, and the wood £199.

Forestry in Barbados.

It may not be generally known that in Barbados special inducements are offered to owners of land, which is practically useless for other purposes, to plant trees. A bounty of 20s. for each acre for seven years is given to the owner who covers his land in that way. Also, land exceeding 1 acre in extent, planted with mahogany trees in the manner specified in the Preservation of Trees Act, No. 1 of 1875, is exempt from all taxation.

Inspectors for the various parishes are appointed under this Act whose duty it is to report annually upon the condition of the plots for which bounties are paid. The reports of five of these inspectors are published in the *Official Gazette* of February 27, 1905, and these show that in the five parishes inspected there are some 400 acres of land planted, cared for, and protected as required by the Act.

The trees planted are chiefly mahogany, but white wood, fiddle wood, manchineel, and several others are also extensively planted.

Tobacco in Hawaii.

An experiment in growing tobacco under shade was commenced in Hawaii in August 1903. Mr. Jared G. Smith, the Officer-in-Charge of the Agricultural Experiment Station, describes the experiment in the *Hawaiian Forester and Agriculturist* for December 1904.

As there was a fall of 20·17 inches of rain between April 8 and 13, a week after the seedlings were transplanted, the loss of transplanted tobacco was very high, and replanting had to be done continuously until June 1. The leaf from the first crop and the ratoon crop was harvested as it ripened in July, August, and September. The picking during the three months amounted to about 1,000 lb. of cured leaf of very variable quality. The varieties tried were Deli, Florida-Sumatra, and Java-Sumatra.

Mr. Smith considers the outlook for tobacco cultivation in Hawaii good, provided suitable land can be placed at the disposal of those who have sufficient capital to engage in the industry. There are, perhaps, some 25,000 acres on the islands of the group that possess the necessary physical texture.

Agriculture in British Guiana.

According to the *Annual Report* on British Guiana for 1903-4, the sugar crop entered for export amounted to 125,949 tons, as against 120,127 tons for the previous year; the larger shipment is in great part due to extension of cultivation, the extension being almost entirely occupied by new varieties of sugar-cane. The acreage in cultivation by cane farmers may be estimated at 2,500 acres. It is mentioned that the cultivation of new varieties of cane on the estates of the colony continued to attract much attention on the part of the planters generally.

Prospects of the Onion Crop.

From the reports of local officers of the Imperial Department of Agriculture, it would appear that the results of experiments in growing onions in these islands during the present season are not as satisfactory as they have been in previous seasons. The yield has been rather poor and the bulbs of small size. In all cases this result is attributed to the abnormally dry weather since the onions were planted. In most cases the seed germinated well.

The seed was distributed in small quantities, so that it is difficult to obtain an accurate estimate of the acreage planted or of the yield of onions. Generally speaking, it is not considered likely that the quality reaped will exceed the local demand in each island. It may be mentioned that in Trinidad, where onions failed entirely last year, the experiments have been very successful, the weather being quite favourable, viz., showers during growth and dry weather for ripening.

Department Publications.

The concluding part of Volume V of the *West Indian Bulletin* is issued to-day. This number contains a report of the proceedings at the Agricultural Conference and an instalment of the papers read. These deal with the 'Results of recent Experiments with Seedling Canes and Manurial Experiments in the West Indies.' The papers are those prepared by Professor Harrison (British Guiana), Professor d'Albuquerque (Barbados), Dr. Francis Watts (Leeward Islands), and Dr. Ulrich (Trinidad). As the papers cover the work done during three years, interesting results are recorded. This publication is obtainable of all agents for the sale of the Department's publications, price 6d., post free 8d.

The first part of the large official report of the Sugar-cane Experiments in the Leeward Islands during the season 1903-4 is also issued to-day. Part I deals with experiments with varieties of the sugar-cane, and also contains appendices on the chemical selection experiments, the experiments in raising seedling canes, and the experimental treatment of cane tops and cuttings with germicides before planting. The price of this report (part I) is 1s. Part II, which is devoted to the experiments with manures, will be issued shortly.

It is expected that the title page and index to the third volume of the *Agricultural News* will be issued as a supplement to the next issue.

Black Boll of Cotton.

As was briefly mentioned in a former issue of the *Agricultural News* (Vol. IV, p. 43), Mr. L. Lewton-Brain, B.A., F.L.S., recently visited Antigua and Montserrat for the purpose of investigating the 'Black Boll' disease in cotton.

In reporting on his investigation, Mr. Lewton-Brain states that this is undoubtedly a distinct disease, though sometimes confused with anthracnose and physiological drying up of the bolls. The boll becomes curiously deformed, while internally it is rotten and the lint discoloured. In time the lint becomes a dark slimy mass. But even up to this time there is little external sign of unhealthiness, yet the bolls drop off instead of opening in the usual way.

The disease does not seem to be due to climatic conditions, nor to any particular soil formation, since it occurs in wet and dry seasons, in clay soils as well as limestone; nor is it possible to connect it with any insect attack. Until the point is definitely settled by inoculation experiments, a short, rod-shaped, non-motile bacillus, which is present in diseased bolls, must be regarded as the primary cause of 'black boll.'

It would appear that the spread of the disease is favoured by rich virgin soil and by the excessive use of nitrogenous manures. When the bolls are drying up, the plant should be cut back and the diseased material destroyed; also, after picking the plant remains should be destroyed, while badly infested fields should not be replanted in cotton the following season.

Soil Inoculation.

Several references have recently been made in the *Agricultural News* to the work of the U. S. Department of Agriculture in connexion with soil inoculation for leguminous crops. The September issue of the *Journal of the Board of Agriculture*, Great Britain, contains an account of investigations in the same direction that have been made by Dr. Hiltner, of Munich. The results of some 400 experiments carried out in different parts of Germany appear to have been, on the whole, exceedingly favourable. Early in last year the new nitragin was offered free of cost to members of the German Agricultural Society on the condition that it was used according to the directions. The demand was so great that the free offer had to be withdrawn, and arrangements were made to sell the substance in quantities sufficient to treat the seed of $\frac{1}{2}$ acre for 1s.

The February issue of the same journal notifies British farmers that they can obtain this new inoculating material from Dr. Hiltner at the price of 2s. per tube (sufficient for $\frac{3}{8}$ to $\frac{1}{2}$ acre). The principal crops for which cultures are available are peas, horse-beans, clovers, lucerne, and vetches.

The cultures prepared at Munich differ from those sent out by the U. S. Department of Agriculture in that the bacteria are not put up in the dry form. Each tube is accompanied by a nutrient substance in the form of a powder consisting of a mixture of pepton and grape sugar which must be dissolved in the water or milk, into which the contents of the tube is turned out, about half an hour before the bacilli are introduced.



INSECT NOTES.

The Corn Ear Worm.

The Corn Ear Worm and the effects of its feeding are well known to planters in the West Indies. In every crop of corn there are ears in which the grain has been eaten from the tips, the ears sometimes being totally destroyed.

The leaves also of the corn plant suffer from the depredations of this insect. Down in the crown of the young plant one or more of the larvae eat into the tender leaves, which, when extended and spread out, show the results in their ragged and perforated appearance. It is likely, however, that the appearance of the adult is not so well known, nor, possibly, are the habits and life history. Specimens from St. Vincent and Barbados sent for identification to the Bureau of Entomology, U. S. Department of Agriculture, were determined to be *Laphygma frugiperda*, and the following account is largely taken from Bulletin 29 issued by that Bureau.

The moth which produces the Fall Army Worm, as it is known in the United States, is a member of the family Noctuidae. It is quite variable, there being two distinct forms, in one of which (fig. 6 *a.*) the forewings are rather dull greyish-brown above; in the other the colour and pattern are more like that shown at *b.* (fig. 6).

The hind wings are glistening white with rosy reflections, having a slightly smokey area, with an inner dark line along the posterior borders, where the veins are also dark and distinct.

The egg, very much enlarged, is shown at *a.* (fig. 7), the upper figure showing the side view and the lower the top view. The diameter of the egg is about $\frac{1}{32}$ inch. The eggs are laid in clusters of fifty to sixty or more and covered with mouse-coloured down from the body of the parent (fig. 7 *b.*).

The larva when first hatched (fig. 7 *c.*) is nearly black in general appearance, with large black

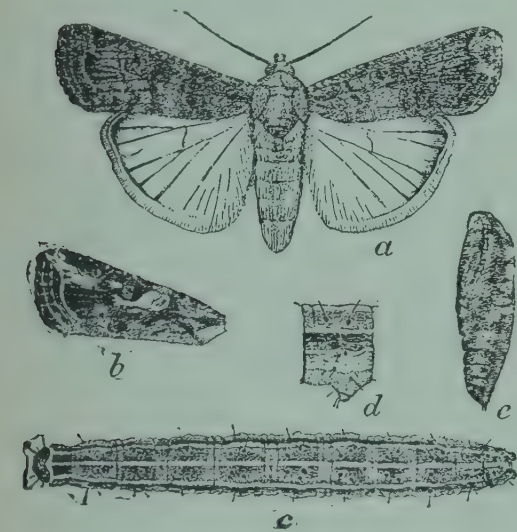


FIG. 6. *Laphygma frugiperda*.—*a.*, moth, plain gray form; *b.*, forewing of more ornamental form; *c.*, larva extended; *d.*, abdominal segment of larva, lateral view; *e.*, pupa, lateral view.—*d.*, twice natural size; others enlarged one-fourth.

[From Bulletin 29, Bureau of Entomology, U. S. Department of Agriculture.]

head, and hairy body. After feeding for a few days the larva becomes greenish from the food it has eaten. The same variability in colour seen in the mature insects is to be seen in the caterpillars. When full-grown they measure about $1\frac{1}{2}$ inches in length. The body is striped on a ground colour which varies from pale yellowish-brown to black, more or less strongly streaked with dull yellow. Three thin

stripes of pale yellow extend along the dorsal surface, the middle one is nearly straight, the two side ones slightly sinuate with the prominence of each segment. On each side there is a broad yellow undulating line, somewhat mottled with red. The under surface is pale, varying from dull yellow to greenish, sometimes mixed with red.

The pupa is about $\frac{5}{8}$ inch in length, mahogany-brown in colour, blunt and rounded at the anterior end, pointed, and tipped with two small spines at the posterior end. In the United States grasses are the favourite food of this insect, with corn perhaps next in favour. It is recorded, however, as attacking a great number of other plants, when it occurs in large numbers and its favourite foods become scarce.

In the bulletin from which the preceding statements are taken it is stated that the larva goes into the ground to pupate. In the West Indies the pupa is very frequently found in the ear of corn. There are two or three generations each year in America, but it is not known how many occur in these islands. The length of time required for the life-cycle is, however, short and probably there are several broods. The caterpillars are cannibals and when several are together only one or two reach maturity, the others having fallen victims to their companions. This may account for the fact that only a few larvae are to be found in the crown of any corn plant or in a single ear.

Bulletin 48 of the Florida Agricultural Experiment Station gives the following method of dealing with this pest in corn, which would probably be efficient and easy of application in the West Indies:—

‘When the caterpillars are feeding in the crown of the plant they may be poisoned by a mixture consisting of half a teaspoonful of Paris green thoroughly stirred with 1 quart of corn meal. This may be applied by means of a sprinkler made by punching a large number of fine holes in the bottom of a tobacco tin and shaking the poisoned meal from it into the crown of the plant. This would probably prevent serious injury to the leaves, and by reducing the number of moths in the succeeding brood protect the ears, to a large extent.’

References to the occurrence of this pest in corn in the West Indies will be found in the *Agricultural News* (Vol. I, p. 184; Vol. II, p. 216; and Vol. III, p. 410). It has once been recorded as attacking cotton bolls in Barbados in the same way as the cotton boll worm (see *Agricultural News*, Vol. III, p. 426).

Mongoose and ‘Bull Frogs.’ Mr. A. J. Jordan writes from Antigua that he had observed a mongoose with a ‘bull frog’ in its mouth and mentions that he was not aware that the ‘bull frog’ was among the creatures eaten by the mongoose. In Barbados it is well known that the mongoose eats the ‘bull frog.’ Heaps of bones and debris of this animal are to be observed outside the holes frequented by the mongoose. As the ‘bull frog,’ which is really a toad, destroys insects and slugs, it deserves to be encouraged everywhere in these islands. An account of the usefulness of the toad will be found in the *Agricultural News*, Vol. III, p. 362.

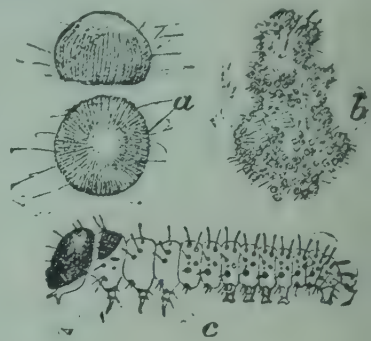


FIG. 7. *Laphygma frugiperda*.—*a.*, egg from side view in upper figure, from above in lower figure; *b.*, egg clustre; *c.*, newly hatched larva.—*a.*, *c.*, much magnified; *b.*, somewhat enlarged. [Ibid.]

AGRICULTURE IN ST. LUCIA.

The following is a summary of an address delivered by the Imperial Commissioner of Agriculture before the St. Lucia Agricultural Society on February 22 last, for a report of which we are indebted to the *Voice of St. Lucia*:—

Sir Daniel said that it was time that St. Lucia roused herself to a consciousness of her agricultural necessities. Her planters must organize, as those of other colonies had done, to promote the cultivation of the various products for which her soil was suited. He was always willing to give as much of his time and attention to St. Lucia as to any other colony, and the Imperial Department had been as generous to the island as, if not more so than, to her neighbours. But he could not say that the response was encouraging. Committees for special purposes had been formed; experiments for definite objects had been started; but the results had not come up to expectation. But he was not deterred by setbacks, and he would propose to the Agricultural Society of St. Lucia to name a Committee representative of the agricultural industries of the island, as had been done in other colonies, who would command the confidence of planters and of the population generally, and who could confer with him, whenever he visited the island, on agricultural matters. Sir Daniel instanced the Cotton and Banana Committees of Barbados, the Committee of the Agricultural Society of Grenada, and the Committee in Antigua of leading planters which was always in touch with Dr. Watts, and, through him, with the Imperial Department. He would like such a Committee appointed at St. Lucia.

Mr. McHugh moved that the Hon. E. DuBoulay, the Hon. G. Graf, the Hon. G. Ponsonby, Messrs. Hugh Hunter, C. R. Kennaway, George Barnard, R. G. McHugh, E. G. Bennett, S. D. Melville, with the Agricultural Superintendent and the Agricultural Instructor, be invited to form a Committee to meet and discuss with the Commissioner of Agriculture on all subjects of agricultural interest to the people of St. Lucia, and that the Secretary of the Agricultural Society be asked to act as Secretary to the Committee.

Sir Daniel said he thought that it was most desirable that sugar-cane experimental plots should be established in St. Lucia, as had been done in some of the neighbouring islands, and that cane farming should be promoted in connexion with the Central Sugar Factories; the canes to be paid for on a sliding scale regulated by the price of sugar on the New York and London markets.

Though the cultivation of cotton had not been taken up with enthusiasm in St. Lucia, Sir Daniel thought that the experiments at the Agricultural School demonstrated that, under favourable conditions, this industry could be taken up with every prospect of success. There Sea Island cotton planted in June last was now being picked and was yielding at the rate of 300 lb. of lint to the acre. Another lot planted in September was expected to do well but not to give as high a yield. That plot at Union could not be the only place in the island favourable for the growth of Sea Island cotton. But the plants required high cultivation, constant looking after, and took kindly to manure. The actual condition of the cotton market justified his repeated assurance to the West Indies that, whatever the fluctuations in the price of Upland cotton, Sea Island would not be seriously affected. The price of the former had gone down to 4d. per lb., while Sea Island was quoted at 1s. 1½d. per lb., and the first shipments from Barbados had realized 1s. 4½d. per lb., netting, on the best lands, about £17 an acre.

Then there was fruit, in which several of the islands

were building up a trade. From Barbados they were shipping 2,300 bunches of bananas to England every fortnight. The fruit was arriving in fairly good condition, and was establishing a reputation. The banana was the Chinese variety, a small tree that bore large bunches. The best time to cut them was just when the fingers began to round, not while they were angular. In Barbados the best results were obtained by packing single bunches in crates, with cotton-wool and paper. The crates, wool, and paper cost about 1s. 2d. The freight was 1s. to 2s. a bunch by the ocean steamer; say, an average of 1s. 6d. per crate. Take the value of the bunch at 10d. in the colony, this, with the charges, would work out at 3s. 6d. in England, where, if it arrived in good condition, the bunch would sell at 5s. to 7s., according to the market. A country which was growing cacao on an expanding scale was very advantageously situated for starting the banana business. Bananas had to be planted for the protection of the young plants. Why not grow a quality of banana which was sure of a good market instead of planting inferior qualities which could obtain only a lesser price? He was convinced that if the Chinese banana were grown in St. Lucia in quantities to supply, say, 5,000 bunches a month, it would be worth while for steamers, properly fitted with cool chambers, to call at Castries to take them. He was not free to make any definite promise, but he had no hesitation in saying that, if the fruit were forthcoming, the means of carriage would be found, so there need be no fear of not finding the means of conveying the fruit to market.

To make a start, Sir Daniel said he was prepared, later on, if the matter were taken up, to arrange to ship by each Royal Mail steamer, 20 bunches of Chinese bananas, delivered in Castries, cut at the right stage, and of not less than 8 hands to the bunch.

Sir Daniel Morris mentioned that there were plants of the Chinese banana growing at the Botanic Station and at the Agricultural School at Union, and, probably, more or less all over the country.

Mr. McHugh suggested that the Agricultural Society might procure a supply of suckers of the Chinese banana for sale to cultivators throughout the island.

A BACTERIAL ROT OF ONIONS.

The following note by Mr. A. J. Brooks, of the Agricultural School, Dominica, is likely to be of interest to onion growers. Mention has been made of the Bacterial Rot of Onions in the *Agricultural News* (Vol. III, p. 245), a fuller account being published in the *West Indian Bulletin* (Vol. V, pp. 134-9):—

The results of experiments in connexion with onion growing at Dominica tend to prove that the bacterial rot is largely due to excessive moisture at the ripening stage.

Last season the crop germinated and grew well, and splendid bulbs were formed. Rains, however, set in during the ripening season (December and January) with the result that nearly the whole of the crop was lost by this disease.

This season another trial was made. The crop was grown on the same plot of land and received the same cultivation as on the former occasion. In this instance, however, the ripening period was characterized by splendid dry weather with the result that absolutely no loss was experienced from the 'rot.'

The yield was an excellent one, viz., 4,000 lb. to the acre. The bulbs found a ready sale locally, realizing a net profit of \$164.24 to the acre.



GLEANINGS.

During the past fortnight 137 bales of West Indian cotton have been imported into Great Britain. (*West India Committee Circular.*)

The value of bananas imported into the United Kingdom during January was £73,923 as against £55,799 in the previous January. Similarly, oranges show an increase of £34,174.

The opening price for Antigua molasses is 20c. per Imperial gallon, package included, at which a cargo lot has been bought. (Bennett Bryson & Co.'s 'Market Report,' March 8.)

The degree of Doctor of Science (D.Sc.) has been conferred by the University of Oxford upon Mr. H. H. Cousins, M.A., F.C.S., the Government Analytical and Agricultural Chemist for Jamaica.

For some time experiments have been in progress in Trinidad with a view to the use of bamboo pulp for paper making. A syndicate proposes to ship to England the bleached pulp prepared in cakes. (*Port-of-Spain Gazette.*)

In his opening speech to the Legislative Council of Jamaica his Excellency the Governor stated: 'I am informed that there is in England a good market for all properly cured tobacco, and that the supply is unequal to the demand.'

A barrel containing pumpkins, papaws, eddoes, beans, etc., was shipped by the Imperial Department of Agriculture from Barbados by the R.M.S. 'Atrato' on March 11, for the Royal Horticultural Society's second exhibition of colonial fruit.

By the R.M.S. 'Atrato,' which left on March 11, 2,327 bunches of bananas were shipped from Barbados. This is the largest shipment ever made by one mail. There were also shipped 8 barrels of sweet potatoes and 2 barrels of yams.

The Manchester Correspondent of the *Cotton Trade Journal*, of Savannah, Georgia, writes: 'The new crop of West Indian cotton now beginning to arrive will seriously compete with Carolinas. Some 5,000 bales of West Indian will be marketed this season.'

Mr. W. M. Smith writes from Grenada: 'So-called "male" cacao trees are to be found in several places in Grenada. They flower in profusion almost throughout the year. Occasionally a pod may be seen on them, which consists solely of shell and core, there being no beans and no cavity.'

A young ram goat, six months old (the offspring of the Department's stud goat 'Bruce'), is for sale in Barbados. Further particulars may be obtained at the Head Office of the Imperial Department of Agriculture.

In regard to the exports of honey and bees'-wax from Jamaica in the year 1903-4, it is stated in the *Annual Report*: 'Bees'-wax holds its own. Honey shows an advance. The value of these two products together was £20,852, against £19,617 in the previous year.'

At the regular monthly meeting of the Trinidad Agricultural Society held on March 14, the discussion on the cane-farming industry was resumed. Finally, Mr. Wyatt's motion urging the necessity for placing the industry 'on a firm, satisfactory, and permanent footing' was agreed to.

According to the *Board of Trade Journal*, it is understood that the plant for the Hinton-Naudet process, which was made in Glasgow for Trinidad, is now experimentally at work on this year's crop in that island. The *Port-of-Spain Gazette* of March 14 contains a description of this system and of the plant which is in operation at Caroni estate.

With reference to the note in the last issue of the *Agricultural News* on epizootic lymphangitis, it may be mentioned that the Board of Health at Barbados notifies that no animals suffering from this disease will be allowed to be landed; also that the landing of cattle from Antigua is prohibited so long as the skin disease, supposed to be caused by tick bites, exists in that island.

Mr. W. M. Smith writes from Grenada that at Nian-ganfoix estate 2,000 fruits were picked from one orange tree during the last crop. The tree is 30 feet high and spreads its branches about 25 feet. The large yield is attributed to the application of basic slag and sulphate of ammonia to the cacao field in which the tree is growing. The fruits were of good size and flavour.

With reference to a note in a recent issue of the *Agricultural News* (Vol. IV, p. 53) on the destruction of rats and mice by means of cultures of pathogenic bacteria, it may be mentioned that the suggestion has been made to deal with the mungoose in a similar way. It would be interesting to know if anything of the kind has ever been attempted with the mungoose.

In the report for 1904 of the Police Magistrate for the western district of St. Lucia it is stated: 'During the last season the cacao crop was good generally. This season, on the lower lands, the crop is good and promises well; on the higher lands it is decidedly poor, and fears are entertained that there will be no improvement later. It seems that an excess of rain benefits the lowlands and injures the highlands.'

The *Gardeners' Chronicle*, referring to a method of seasoning wood by impregnating it with a solution of sugar, suggests the utilization of sugared wood for such objects as mangle-rollers, stool legs, and for any other purpose where stability is the principal consideration. Sugared wood, it is stated, is not susceptible to attacks of fungi, while the addition of poisons to the sugar solution will prevent its destruction by insect pests.

TRADE IN ORANGE AND CITRON PEELS.

At the request of the Imperial Commissioner of Agriculture Mr. J. R. Jackson, A.L.S., has made inquiries into the matter of the trade in England in orange and citron peels. The following is his report:—

The English trade in orange and citron peels is one of a varied character. In the first place, there are the fresh peels that are so largely used for culinary purposes under the name of candied peels in which the fresh rind is first placed in brine to soak and then treated with sugar or syrup; but orange peel, both in the fresh and dried states, is used in medicinal preparations and in the last-named condition appears regularly at the London drug sales. It is from the Seville orange that this rind is obtained, and Malta supplies a considerable portion. Tincture of orange is made by macerating the fresh peel in alcohol, while infusion of orange is prepared from the dry peel; both of these are important ingredients in the composition of many well-known medicines, though apart from the bitter property of orange peel its use may be said to be that of a flavouring agent rather than as a medicine. In the course of inquiries as to the possible future of any of the West India Islands supplying the London market with orange or citron peel, the following replies have been received:—

Messrs. Jenkin & Phillips, the well-known produce brokers of 14, Mincing Lane, write: 'As far as we can find out no orange or citron peel comes to London from the West Indies, as it would not be able to compete with the prices obtained for goods from Messina which are: oranges, 29s. per pipe of 7 cwt; and citrons, 25s. per pipe of 7 cwt. The competition in these articles is very keen indeed, which accounts for the very low prices. It is not possible for us to say if the quality would be different in any way, but if we have samples we could then give full details.'

Messrs. Sparks, White & Co., of 62, St. John Street, E.C., say: 'The country supplying Great Britain with brined orange and lemon peels is Sicily (as well as Italy), but the majority of the citron peel is shipped from the Adriatic. The demand for candied peels is a decreasing one, and whereas a few years ago the majority of the candied peels produced in England, with the exception of citron, were all prepared in England from the fresh fruit, it has since been found that an equally good article—and by some considered better—is produced from the peels brined where they are grown. As to the West Indies supplying the brined orange and lemon peels, it is no doubt simply a matter of price. The freightage from the Mediterranean is exceedingly cheap and there are boats to all points in England practically every week.'

The small quantities of dried orange peels which have been sent to the United Kingdom from the West Indies do not show the quality of the peels (from the bitter fruit) to be equal to that produced in the South of Europe and North Africa; furthermore the prices of them are higher, and as a result there is now practically no dried orange peel reaching England from the West Indies. There is only one exception, and that is a hybrid peel produced at St. Kitt's, which is known in the trade as 'Curaçoa.' Messrs. Sparks, White & Co. express their willingness to supply any further information that may be required by the Imperial Department of Agriculture, if direct communication is made to them on the subject. It may perhaps be of some further interest to say that, while writing thus early in February, tincture of orange peel and the peel itself from Seville oranges are being advertised by a well-known wholesale

druggist in one of the trade journals with the following note on the season 1905: 'Seville oranges are coming over in good quantity and in excellent condition. We can now offer the fresh-cut peel and we shall have the new dried peel and the new tincture towards the end of the month.' The fresh peel is described as being in spirals, wrapped in parchment in quantities of 5 lb., 10 lb., and 50 lb., at the rate of 9d. per lb. for the smaller quantity, 8d. per lb. for the next, and 7d. per lb. for the largest. The following are the Mincing Lane quotations for orange peel for the month of January: New Crop Maltese, darkish, 10d. per lb., and for fine bright 1s. 3d. is asked. On the 19th. orange peel was in plentiful supply; for several cases of fair bright thin machine-cut Tripoli strip 10d. per lb. was paid.

BEE KEEPING.

The Adulteration of Honey.

Reporting on the work of the Chemical Branch of the Department of Agriculture, Victoria, for 1903-4, Dr. F. J. Howell makes the following remarks on the adulteration of honey:—

The most common adulterants of honey are glucose, cane sugar syrup, and the inverted cane sugar. The presence of glucose is a matter of easy detection. The detection of cane sugar presents also very little difficulty; but the question of an intentional addition as an adulteration is complicated by the absence of definite knowledge as to how much a genuine article should contain. The particular flora, and the artificial feeding of the bee are responsible for large variations in this direction, as is evident in the composition of some of the Californian honeys. As invert sugar enters largely into the composition of a pure honey, the known limits of the quantities, naturally present in unadulterated samples, are the only sure guide to the expressions of opinions as to the genuineness or otherwise of a sample in this direction. With respect to cane sugar, according to Wiley, it is a rare thing to find a genuine honey containing more than 4 per cent. of sucrose, but there are undoubted instances of pure honeys very considerably exceeding these figures.

It is a usual practice, I believe, to feed bees at a certain time of the year with a partly inverted sugar syrup; although, it is stated not for sale purposes. The production of the bee from such a food cannot be regarded as a pure honey. This practice and certain unique conditions of flora and climate may explain, to a degree, certain characteristics of some of the samples sent in as pure.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados in the R.M.S. 'Esk' on March 13 for Grenada for the purpose of attending the Agricultural Show held in that island on March 16 and 17. Sir Daniel Morris, after spending a day *en route* at St. Vincent in inspecting the Central Cotton Factory in that island, returned to Barbados on March 19 by S.S. 'Orinoco.'

Mr. Bertram Mason, who has held the post of Junior Clerk at the Head Office of the Imperial Department of Agriculture for the past six years, leaves Barbados to-day in R.M.S. 'Trent' for England, having been offered the post of Treasury Clerk in the British Central African Protectorate.

MARKET REPORTS.

London,—February 28, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 24, 1905; and 'THE PUBLIC LEDGER,' February 25, 1905.

ALOE—Barbados, 15/- to 40/-; Curaçoa, 15/- to 41/- per cwt.
ARROWROOT—St. Vincent, 1½d. to 1¾d. per lb.
BALATA—Demerara sheet, 1/10; Venezuela block, 1/4 per lb.
BEES'-WAX—£7 5s. to £7 15s. per cwt.
CACAO—Trinidad, 55/- to 60/- per cwt.; Grenada, 51/- to 55/- per cwt.; Jamaica, 48/- to 53/6 per cwt.
CARDAMOMS—Mysore, 7½d. to 2/- per lb.
COFFEE—Jamaica, good ordinary, 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 11½d.; fine, 12½d.; extra fine, 14½d. per lb.
FRUIT—
BANANAS—4/- to 6/- per bunch.
GRAPE FRUIT—12/- to 14/- per box.
ORANGES—6/- to 12/- per case.
PINE-APPLES—St. Michael's, 1/9 to 4/- each.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, good ordinary, 34/-; bright small 37/- per cwt.
HONEY—Jamaica, 16/- to 22/- per cwt.
ISINGLASS—West Indian lump, 2/3 to 2/9; cake, 1/2 to 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 10d. per gallon; concentrated, £14 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/4 per lb.
LOGWOOD—£4 to £4 15s.; Roots, £3 10s. to £4 per ton.
MACE—Fair to good pale, 1/4 to 1/5; reddish, 1/3 per lb.
NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.
NUTMEGS—71's to 72's, 1s. to 1s. 2d.; 80's, 10½d.; 120's, 6d. per lb.
PIMENTO—2¾d. to 2½d. per lb.
RUM—Demerara, 1s. 2d. to 1s. 4d. per proof gallon; Jamaica, 2s. per proof gallon.
SUGAR—Yellow crystals, 22/- to 24/- per cwt.; Muscovado, 18/- to 19/- per cwt.; Molasses, 16/- to 19/- per cwt.
SULPHATE OF AMMONIA—£13 10s. per ton.

Montreal,—February 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.
CEDAR—No quotations.
COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.
COFFEE—Jamaica, medium, 9c. to 9¼c. per lb.
GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.
MOLASCUIT—Demerara, \$1.32 per 100 lb.
MOLASSES—Barbados, 28c. to 39c.; Antigua, 23c. to 25c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 19c. per lb.
ORANGES—No quotations.
PIMENTO—Jamaica, 5¼c. to 5½c. per lb.
PINE-APPLES—No quotations.
SUGAR—Grey Crystals, 96°, \$3.65 to \$3.75 per 100 lb.
—Muscovados, 89°, \$2.90 to \$3.00 per 100 lb.
—Molasses, 89°, \$2.65 to \$3.75 per 100 lb.
—Barbados, 89°. No quotations.

New York,—March 3, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.
COCOA-NUTS—No quotations.

COFFEE—Jamaicas, 8c. per lb. (ex store).
GINGER—Jamaica, 5½c. to 5¾c. per lb.
GOAT SKINS—Jamaicas, 57c. per lb.
GRAPE FRUIT—Jamaicas, \$3.00 to \$4.50 per barrel.
ORANGES—Jamaica, \$3.00 to \$3.50 per barrel (stem cut).
PIMENTO—4½c. per lb.
SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4½c.; Molasses, 89°, 4¾c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—March 11, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.
CACAO—Dominica, \$10.00 to \$10.50 per 100 lb.
COCOA-NUTS—\$14.00 per M. for husked nuts.
COFFEE—\$10.50 to \$12.00 per 100 lb.
HAY—90c. to \$1.00 per 100 lb.
MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00.
MOLASSES—20c. per gallon.
ONIONS—Lisbon (stringed), \$3.75 per 100 lb.
POTATOS—ENGLISH, \$1.92 to \$2.04 per 160 lb. (retail).
RICE—Ballam, \$4.75 per bag (190 lb.); Patna, \$3.25 per 100 lb.
SUGAR—Muscovados, 89°, \$2.95; Dark crystals, 96°, \$3.50 per 100 lb.

British Guiana,—March 9, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.75 to \$8.00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
CACAO—Native, 13c. to 14c. per lb.
CASSAVA STARCH—\$6.00 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—Rio and Jamaica, 14½c. to 15c. per lb. (retail).
—Creole, 12c. to 14c. per lb.
DHAL—\$4.25 to \$4.50 per bag of 168 lb.
EDDOES—\$1.44 to \$1.68 per barrel.
MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).
ONIONS—Madeira, 3½c. to 4c.; Lisbon, 4½c.; Garlic, 5½c. to 6½c. per lb.
PEA NUTS—American, 5½c. per lb. (retail).
PLANTAINS—24c. to 60c. per bunch.
POTATOS—ENGLISH, Picked, \$2.50 to \$3.00 per barrel.
RICE—Ballam, \$4.35 to \$4.40 per 177 lb.; Creole, \$4.00 to \$4.15 per bag.
SWEET POTATOS—Barbados, \$1.20 per bag; \$1.32 per barrel.
TANNIAS—\$2.40 per barrel.
YAMS—White, \$1.92 per bag.
SUGAR—Dark crystals, \$3.30 to \$3.40; Yellow, \$4.25 to \$4.30; White, \$4.90 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—March 9, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$11.80 to \$11.90; Estates, \$12.00 to \$12.25 per fanega (110 lb.); Venezuelan.—No quotations.
COCOA-NUTS—\$20.00 per M., f.o.b.
COCOA-NUT OIL—80c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 8½c. per lb.
COPRA—\$2.90 to \$3.00 per 100 lb.
MOLASSES—20c. per gallon.
ONIONS—Lisbon, \$3.00 per 100 lb. (retail).
POTATOS—ENGLISH, \$1.50 per 100 lb.
RICE—Ballam, \$4.40; Patna \$5.50 per bag.
SUGAR—White crystals, \$4.50; yellow crystals, \$3.75 to \$4.00; molasses sugars, \$2.75 to \$3.50 per 100 lb.

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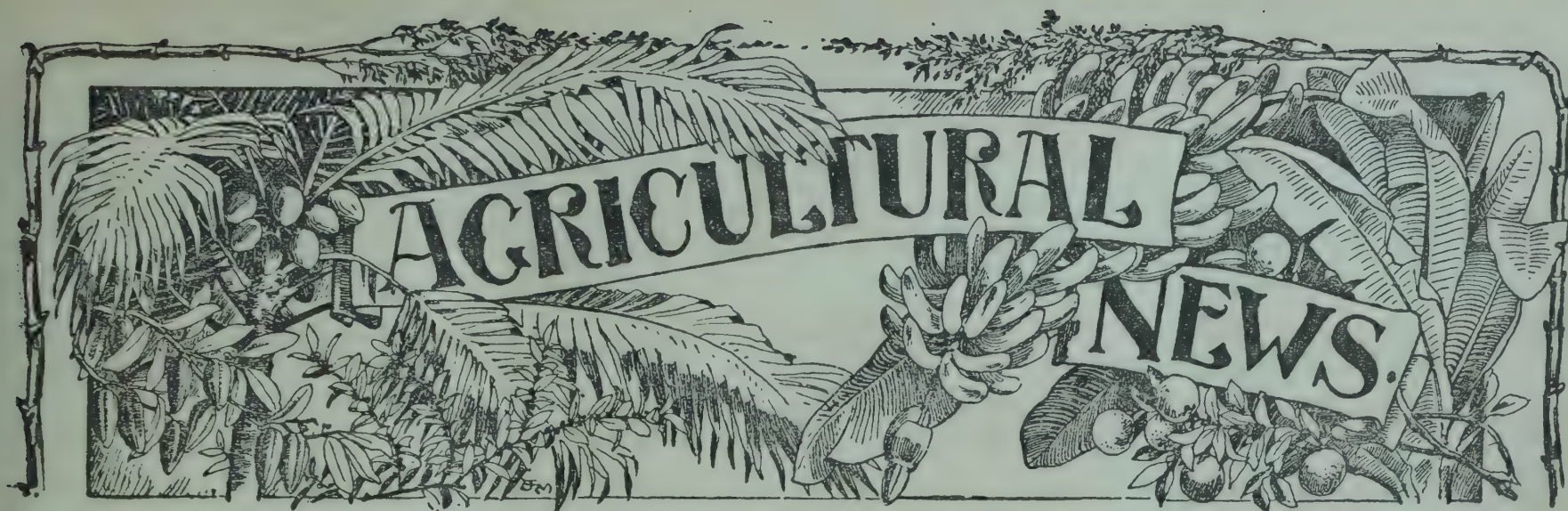
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resolved not to sell their seed 'to communities outside of South Carolina.'

This means that in order to carry on the cotton industry in the West Indies the planters will have to depend on seed to be obtained locally.

Although the situation, at first sight, might be regarded as discouraging, there are good grounds for believing that the promising cotton industry started in these colonies will not materially suffer from the action taken by the planters in the Sea Islands. Thanks to the efforts made last year by the Imperial Department of Agriculture, there is already existing in the West Indies a supply of Sea Island cotton seed as good as, if not better than, the crop lots produced in the United States. All that is necessary is to make a rigorous selection of the best seed and, after having it carefully disinfected, to place it within reach of the planters in such quantity and at such a price that in no instance will it be necessary to plant inferior or doubtful seed.

Last year the Imperial Department of Agriculture imported and supplied to planters 35,700 lb. of Rivers' selected Sea Island cotton seed and the results from this seed, in good soils and with suitable cultivation, have been uniformly satisfactory. In some instances Mr. Oliver reports that the cotton produced this year from Rivers' seed in the West Indies 'is better than Rivers' own cotton;' so that, so far from having deteriorated, it would appear that the soil and climate, in some localities at all events,

Selected Cotton Seed for 1905.

AS announced in the *Agricultural News* (Vol. IV, p. 72), it will not be possible to obtain reliable cotton seed from the United States this year, as the planters in the Sea Islands have

in the West Indies are capable of producing a higher quality of cotton than the Sea Islands themselves. This is confirmed by the fact that the shipments of 62 bales from Messrs. Simmons & Hazell of St. Vincent 'are quite the best cotton grown under the auspices of the British Cotton-growing Association and have been sold at an all-round price of 17*d.* per lb.' If this cotton had been 'in the market in October and November last,' it is stated, 'it might easily have been sold for 21*d.* per lb.' Again we are informed: 'West Indian cotton is to-day fetching 2*d.* to 3*d.* per lb. over similar qualities of American cotton.'

It is reasonable to suppose that, if the seed from the high-priced cotton, above referred to, were carefully selected and grown under suitable conditions, the crop to be reaped next year should be as good as, if not better than, this year's crop.

The advantage is all in favour of the West Indies, for this is the original home of Sea Island cotton, and the conditions, on that account, should be more congenial to it here than in South Carolina.

Coming now to practical measures, it is proposed, in order to safeguard the prospects of the cotton industry, that the Imperial Department of Agriculture should undertake to acquire all that can be spared of the best seed and have it carefully hand-picked and disinfected and supplied to the planters at cost price.

The Department will purchase the seed in the condition in which it leaves the gins, mixed with bits of lint, immature seeds, trash, etc. It will have this carefully picked over by hand so as to retain only about one half to consist of the largest and finest seed for planting purposes. The residue will be returned to the grower to be crushed for feeding purposes. The selected seed will then be disinfected in order to protect it from fungoid and insect pests and it will be offered to planters for sowing purposes at the rate of 5*c.* (2½*d.*) per lb. This, as already shown, (p. 33) is at a lower rate than is charged for long-staple cotton seed either in the Sea Islands or in Egypt.

It is strongly urged that no cotton seed be planted this year unless it has been disinfected beforehand. Otherwise, in the case of seed shipped from one island to another, there would be the probability of introducing either the cotton worm, the leaf-blister mite, the cotton stainer, black boll, anthracnose or other

diseases into localities where, hitherto, they have been unknown. For instance, the cotton worm is not prevalent in St. Vincent, the leaf-blister mite and the cotton stainer are not present at Barbados, and few, if any, of the diseases familiar in the lesser Antilles are to be found in Jamaica.

A general and indiscriminate interchange of untreated cotton seed between the several islands would result in such a wide-spread distribution of cotton diseases as would probably kill the industry.

It is desirable, therefore, under the special circumstances now existing, that the distribution of seed for planting purposes should be placed in the hands of a central authority, having no pecuniary interest in the matter, possessing the confidence of the community, and provided with the necessary staff and appliances for carrying on the work solely in the interest of those concerned.

Cotton growers who desire a supply of the 'selected and disinfected cotton seed' offered by the Imperial Department of Agriculture for planting during the coming season are advised to communicate, without delay, with the officers of the Department in the colonies in which they reside. A remittance for the full amount must accompany the order, or it cannot be entertained. Orders will be received, for the Leeward Islands, by Dr. Francis Watts, Antigua; for Barbados, by Mr. John R. Bovell; for St. Vincent, by Mr. W. N. Sands. Applications from Jamaica, British Guiana, Trinidad, and other colonies, not mentioned above, may be forwarded direct to the Imperial Commissioner of Agriculture, Head Office, Barbados. Applications will be dealt with in the order in which they are received.



SUGAR INDUSTRY.

Observations on Muscovado Sugar.

The Hon. Francis Watts, C.M.G., D.Sc., Government Analytical and Agricultural Chemist for the Leeward Islands, has forwarded 'Some observations on Muscovado Sugar' which deal with matters of special interest to sugar planters. The following is the first part, dealing with:—

SOME CHANGES OCCURRING IN COMMERCIAL SUGARS.

Of recent years two facts of importance to sugar planters in these islands have been observed (a) that sugar is sometimes met with which gives a much lower polariscopic test than experience would lead one to expect, and (b) that some samples of sugar are found to be undergoing changes in polariscopic test. Observation suggests that there may probably be some connexion between these facts.

It is well known to muscovado sugar boilers that at times the syrup, towards the final stages of boiling, will foam and boil with difficulty, this being more frequently the case with juice obtained from canes grown upon dry places, such as hillsides, with a thin coating of soil and more particularly in dry seasons. Certain fields on many estates are known by those in charge of them to be liable to produce juice which will 'scorch' in the process of manufacture. I believe it is the sugar produced from juice of this nature which is liable to yield sugar testing polariscopically considerably below what one would expect.

With normal sugar an experienced observer can estimate the polariscopic test with a fair degree of accuracy. These abnormal sugars, therefore, are a source of disappointment to the producer who, not infrequently, and perhaps not unnaturally, inclines to and expresses the view that the abnormal test is due to errors on the part of the chemist. I have myself examined samples of sugar which have given results from 2° to 3° below what experience in handling sugars led me to expect. One concrete example will suffice.

A sample of massecuite from juice of the kind referred to above was kindly forwarded by the manager of a sugar estate in Antigua. The sugar was cured in an efficient laboratory centrifugal: muscovado sugars so cured usually have a polariscopic test of about 92° and under ordinary circumstances one would have expected the sugar in question to have tested about 92°. It actually tested 88·8 or over 3° below reasonable and skilled expectation. From a monetary point of view this would mean that the sugar would sell for some 8s. per ton less than a skilled manager would have reason to expect. One cannot wonder at disappointment.

This peculiarity appears to be due to the presence in the juice of some unknown constituent which we can only describe as 'gum.' These abnormal sugars will therefore be referred to as 'gummy' in what follows.

Fermentive changes are frequently observed in samples of muscovado sugar; a peculiar and easily recognized aroma is produced and considerable quantities of gas are given off. When these changes take place in tightly packed, pasty sugar the evolution of gas causes the mass to become spongy and to rise like dough, so that the samples not infrequently expand beyond the confines of the tins or bottles in which they are placed. Experiments to demonstrate this expansion have been made repeatedly in the laboratory by packing the sugar in glass cylinders; in the course of a few hours considerable expansion is often observed, while in some cases the sugar has been forced far beyond the top of the containing cylinder. In most cases, however, when the sugar is loosely packed or where, as in the bags and hogsheads in which it is stored, there are numerous air spaces whence the molasses have drained, the gas escapes without difficulty and no visible change takes place. Repeated polariscopic testing has brought to light an unexpected feature of these fermentive changes. In the early stages of the process the polariscopic test of the sugar steadily rises: this takes place when the sugar is kept in glass vessels and is not due to the draining away of molasses. After a time the process is reversed and a steady fall in test takes place. Some examples will show the nature and extent of these changes.

POLARIZATIONS AT VARIOUS DATES.

	April 16.	April 23.	April 30.	May 7.	May 14.	May 21.	May 28.
1.	86·1	87·1	86·9	86·8	86·4	86·5	86·7
2.	88·0	88·5	88·2	88·4	88·2	88·3	88·5
3.	86·9	87·9	87·7	87·4	87·0	87·2	87·0

	June 4.	June 11.	June 25.	July 2.	July 9.	Aug. 13.	Oct. 3.
1.	86·7	86·4	86·1	86·3	86·8	84·9	83·5
2.	88·4	88·2	88·0	87·6	87·4	—	—
3.	87·2	86·9	86·7	86·4	86·3	85·4	83·0

The changes in polariscopic test in the sugars under examination have not been uniformly regular: this is probably due to disturbances resulting from the removal of the sugars from the bottles and their thorough stirring in a mortar before each test was made. Speaking generally, there is a period of rise followed by a period of fall. In the case of No 1. the rise is from 86·1° to 86·9°, that is 0·8°, subsequently falling to 83·5°, or 3·4° below the maximum, the observation extending over 171 days.

In No 2. the rise is from 88·0° to 88·5°, or 0·5°, the minimum observed was 87·4°, or 1·1° below the maximum, the observations extending over 85 days.

In No. 3 the observed rise is from 86·9° to 87·9°, falling subsequently to 83·0°, or 4·9° below the maximum.

These three cases were those of commercial samples which were received in a fermenting condition; it is only reasonable, therefore, to infer that the examination began during the period of rise, and that the rise in test observed is only a portion of that which actually took place so that its full extent is not shown; the probability is that it is much greater.

The changes observed in the case of the sugar prepared by means of the centrifugals were as follows:—

	May 6.	May 13.	May 20.	May 27.	June 3.	June 10.	June 17.	June 24.	July 2.	July 9.
4.	88·8	88·9	91·0	91·3	91·6	91·3	91·1	91·0	91·2	91·0

This sugar was much freer from molasses than an ordinary sample of muscovado sugar: the original polariscopic test, 88·8°, was far below what the appearance of the sugar would lead an experienced observer to expect. The test steadily rose to 91·6°, a rise of 2·80°: a rapid fall to 91·3 followed, succeeded by a slow decline to 91·0°.*

In another instance the following changes were observed:—

	March 10.	March 13.	March 17.	March 21.	March 25.
5.	86·6	87·3	87·9	88·1	88·1

* Complete analyses of this sugar were made at the time when each polariscopic test was ascertained. The discussion of the changes indicated is reserved for the present; the chemical nature of the changes will be dealt with in a subsequent paper.



SUGAR INDUSTRY.

Observations on Muscovado Sugar. (Contd.)

In other parts of the world it has been observed that cargoes of sugar, even of vacuum pan sugars which suffer no loss from drainage, undergo changes, but these changes have usually been in the direction of small lowerings of the test. Where a rise in test has been observed it has usually been attributed solely to the effect produced by the draining away of molasses.

The discovery that samples of sugar, even when kept under conditions which preclude the loss of molasses, may increase in polariscopic test is, I believe, new and of some practical importance. Of late years it has frequently been observed that there is deterioration in the polariscopic test of both crystal and muscovado sugar, and this deterioration has been investigated by several workers, including Shorey in Hawaii, Grieg Smith in New South Wales, Dodson and Browne in Louisiana. The facts now recorded are of a somewhat different nature from those hitherto reported.

The facts here observed have important bearings in several directions. In the first place they are a source of trouble to the practising analyst, for samples of sugar of fair appearance are found to test appreciably lower than experience would lead one to expect. Should a sample of such a sugar be placed in a bottle and be referred to another analyst, who, under colonial conditions may not receive it for a week or ten days, it will possibly be found to test a degree or two higher, and confidence in analytical accuracy is shaken. Again, the same sample tested once more after a lapse of some days may now reveal a different, and perhaps lower, polariscopic test, when further confusion results.

That at least some sample of muscovado sugar is liable to these changes is important alike to buyer and seller and tends to explain those discrepancies which have sometimes been observed by commercial men.

It is not clear to what degree muscovado sugar is subject to these changes, that is to say, whether they are common or whether they are confined to a few instances. So far I incline to the opinion that only 'gummy' sugars are liable to these changes to any appreciable extent and that they do not operate in a serious degree in the case of the bulk of good, dry, muscovado sugar.

A considerable amount of work has already been done in an effort directed towards ascertaining the chemical nature of the changes observed and accounting for them. Reference to this side of the question is purposely avoided in this article, which is written with a view to directing the attention of those commercially interested in sugar to a series of changes to which the sugar they deal in is liable: the scientific aspect is reserved for separate treatment.

Prices of Sugar and Molasses at Barbados.

Mr. J. R. Bovell, F.L.S., F.C.S., has forwarded the following memorandum showing the price of sugar and molasses at Barbados for ten years, 1895 to 1904 inclusive. The crop season is from the beginning of February to the end of June in each year:—

Year.	Average price at which sugar sold per 100 lb.	Average price at which molasses sold per gallon.	Value of 1 ton of sugar and 100 gallons of molasses.
		Cents.	£ s. d.
1895	\$ 1.60	13	10 3 9
1896	1.97 $\frac{1}{2}$	12 $\frac{1}{2}$	11 16 5
1897	1.58	6 $\frac{3}{4}$	8 15 7
1898	1.66	9	9 12 5
1899	2.07	13	12 7 4 $\frac{1}{2}$
1900	2.11	16 $\frac{1}{2}$	13 5 8
1901	1.70	10 $\frac{1}{2}$	10 2 5
1902	1.06	7 $\frac{3}{4}$	6 11 2 $\frac{1}{2}$
1903	1.29 $\frac{1}{2}$	16 $\frac{3}{4}$	9 10 8
1904	1.44 $\frac{1}{4}$	9 $\frac{1}{2}$	8 18 4 $\frac{1}{2}$
Total.	\$16.49 $\frac{1}{4}$	\$1.14 $\frac{3}{4}$	£101 3 7 $\frac{1}{2}$
Average.	\$ 1.64 $\frac{3}{4}$	11 $\frac{1}{2}$ c.	£10 2 4 $\frac{1}{2}$

For nine years, 1895 to 1904, sugar was sold for its value per 100 lb., plus \$5.00 for the hogshead, and molasses at its value per gallon, plus \$4.00 for the puncheon.

Last year, however, the price for sugar and molasses included the price of the hogshead and the puncheon. The actual price of the sugar, therefore, was \$1.69 $\frac{1}{4}$, minus the value of the hogshead, equal to 25c. per 100 lb., and for molasses 13 $\frac{1}{2}$ c., minus the value of the puncheon, equal to 3 $\frac{3}{4}$ c. per gallon. The puncheon netting about 110 gallons, the net value of the sugar therefore was \$1.44 $\frac{1}{4}$, and of the molasses 9 $\frac{1}{2}$ c.

The average value for the ten years 1895 to 1904 was for sugar (100 lb.) as stated above \$1.64 $\frac{3}{4}$, and for molasses 11 $\frac{1}{2}$ c. per gallon.

During the current year (1905) prices have been exceptionally good, reaching in some cases as high as £15 14s. 4d. per ton of sugar and 100 gallons of molasses. This is equivalent to an increase at the rate of £2 8s. 8d. per ton on the average price in 1900.

COTTON INDUSTRY.

Prospects of the Crop.

Fortnightly reports have been received from the local officers of the Imperial Department of Agriculture upon the prospects of the cotton industry as follows:—

TOBAGO.

By the number of applications for seed of Sea Island cotton it is apparent that the cultivation will be extended during the coming planting season.

At the present time cotton is only grown in quantity at one estate, viz., Golden Grove, and it is the short-staple variety, Marie Galante, and is inferior to Sea Island cotton.

Recently a visit was paid there and 18 bales of 500 lb. each were ready for shipment.

BARBADOS.

Since I last reported nearly all the first picking of the cotton has been gathered, but I regret to say that owing to the drought the yield has come much shorter than was anticipated. Most of the cotton plants that have finished bearing their first lot of cotton have been pruned and in some instances the plants are flowering already. Owing to the drought, however, the bolls are not as large as they were last year.

Up to March 10 the Cotton Factory had ginned 353,716 lb. of seed-cotton yielding 98,557 lb. of lint. Of this lint 267 bales containing 93,442 lb. of lint have been made and shipped, and the remaining lint, viz., 5,115 lb. is at the Factory to be baled when sufficient is received for each grower, it being found best to ship, as far as possible, each grower's cotton lint by itself.

Of the 24 bales shipped by the R.M.S. 'Orinoco' on January 14, 14 sold at 16½d. per lb., 6 at 16d., and 4 at 15d. per lb., 3 of these 4 bales being ratoon cotton and one stained cotton. This first consignment was reported upon by the British Cotton-growing Association as 'leaving little to be desired' as regards its preparation, ginning, etc.

With regard to the 35 bales shipped by the R.M.S. 'Trent' on January 28, I have been informed by the Secretary of the British Cotton-growing Association that 34 have sold at 16½d. per lb. He has not yet informed me at what price the other bale, which was of ratoon cotton, has been sold.

Since I last reported the shipment of the 75 bales by the S.S. 'Rosetti' I have shipped 40 bales by the R.M.S. 'Tagus' on February 25, and 93 bales by the R.M.S. 'Atrato' on March 11 last, and I also hope to make a further shipment by next mail.

ST. KITTS.

There is little to report for this period, except that the three ginneries are all doing good work and that shipments of cotton are being made by every steamer.

At Spooner's Factory an improvement has been made in feeding the cotton to the gins by means of 'shoots' which bring the seed-cotton from the upper floor direct to the feeding board. These gins are doing excellent work and averaged 55 lb. lint each per hour over a period of six days.

Account sales were received by last mail of cotton from St. Kitt's at the rate of 1s. 4½d. (33c.) per lb. for well-prepared cotton; some of the same lot that had not been repicked before ginning only fetched 1s. 1d. (26c.) per lb. making a difference of 7c. per lb.

The quality and length of staple were highly spoken of.

The news that the Department was unable to obtain selected Rivers' cotton seed for planting next season has caused much regret among the planters, who had sent in requisitions for large quantities. Steps, however, are being taken to secure the best seed from the growers who planted only Rivers' seed last season, of which there is a sufficient quantity to satisfy all demands.

Disinfecting Cotton Seed.

The most pressing question affecting the cotton industry which now requires to be solved is the careful selection and treatment of the cotton seed proposed to be planted during the coming season. The value of the next year's crop will largely depend on whether the best and healthiest seed is selected or the planters take any seed within their reach and rely on this to produce cotton of the highest quality.

As stated elsewhere, the Imperial Department of Agriculture offers to supply selected West Indian seed from plants that have produced cotton worth 16½d. to 17d. per lb. and to have such seed carefully disinfected beforehand. By such means the planters will have a reasonable guarantee that they are sowing the best seed available, and can look forward with some degree of confidence to favourable returns.

It is recommended that no cotton seed be planted this year that has not been carefully disinfected. This is in accordance with the best practice in other countries and is the only means of maintaining the present stock of plants in the West Indies in a healthy condition.

The following notes may be of interest as showing the desirability of disinfecting cotton seed.

Mr. L. Lewton-Brain, the Mycologist, writes:—

One of the most important ways in which fungoid diseases of plants spread from one locality to another is by means of the spores of the fungi attached to the seeds of their host plants. To meet this, the use of fungicidal steeps is gradually becoming more general among agriculturists.

Fungicidal steeps have been worked out mainly in connexion with 'smut' of wheat, oats, and other cereals. The spores of smut are carried on the seeds of their host which is infected immediately after germination. To destroy these spores different fungicides are widely used, among them being formalin, copper sulphate, and hot water. For potato 'scab,' again, the 'seed' tubers are steeped in formalin or corrosive sublimate. Mention may also be made of the successful treatment of cuttings with Bordeaux mixture for preventing the pine-apple disease of sugar-cane.

The steep used last year by the Imperial Department of Agriculture for cotton seed was a 1 to 1,000 solution of corrosive sublimate (mercuric chloride); this is about equivalent to 1 lb. of corrosive sublimate in 125 gallons (100 wine gallons) of water. The seeds are soaked in this steep for an hour, care being taken that they are thoroughly wetted. They are then taken out of the solution and spread in a thin layer to dry. When thoroughly dry the seeds can be put into bags and kept for some time. It has been definitely proved that this treatment has no injurious effect on germination: the seeds may be planted either immediately on being taken from the steep, or, after thorough drying, at any time for weeks afterwards. An account of the experiments on this point will be found in the *Agricultural News*, Vol. III, pp. 117 and 149.

Disinfecting Cotton Seed. (Contd.)

Mr. H. A. Ballou, the Entomologist, writes:—

There are three pests, it seems to me, that could be transported with the seed, viz., the leaf-blister mite, the cotton worm, and the cotton stainer.

The cotton worm is not likely to be transported in this way for several reasons. So far as is known, the eggs of the cotton worm are always laid on some green part of the cotton plant. There would be no inducement to caterpillars to visit ginneries to infest cotton seed; it is very likely that if, by any chance, caterpillars were carried from the field in the picked cotton, they would soon leave in search of more suitable food.

The leaf-blister mite would probably not infest the seed or be carried with it, but as it is a very serious pest, precautions should be taken to prevent its introduction into localities where it does not occur.

The cotton stainers, on the other hand, feed on the cotton seed, and might be carried from one place to another in or on the bags of seed. In the process of hand-picking, however, it ought to be possible to get the seed quite free from stainers.

Dysdercus andreae occurs in Jamaica, St. Kitt's-Nevis, Antigua, and Montserrat. *Dysdercus annuliger* occurs in Dominica, St. Lucia, Barbados, St. Vincent, Grenada and the Grenadines, and a third species in Trinidad and Grenada. It is important that none of these species should be introduced into islands where they do not now occur. Although *Dysdercus annuliger* does occur in Barbados it is very rarely found there and is not, at present, a pest.

As a precautionary measure, I would suggest the fumigation of all seed, imported to Barbados and St. Vincent for planting, with carbon bisulphide at the rate of 1 lb. carbon bisulphide to every 1,000 cubic feet of space in the box or bin.

This would prevent the introduction of any of the pests mentioned and should be used without fail in Barbados to guard against the leaf-blister mite, and in St. Vincent to guard against the cotton worm, and in other islands when any danger exists of introducing any species of cotton stainer to a new locality.

The treatment with corrosive sublimate, 1 in 1,000, would serve as a protection against those insects that attack stored seeds; corrosive sublimate is a violent poison and sufficient is left upon the seeds after the steeping and drying to prove fatal to insects eating their way through the seed-coats. But it could not, however, be depended on to safeguard against the three kinds of pests mentioned above. For these fumigation would be necessary as already suggested.

Cotton as a Catch Crop in St. Kitt's.

To the Editor of the *Agricultural News*.—

Sir.—The figures and facts detailed below will, I trust, prove of interest to your readers.

For the season of 1904-5 about 70 acres of well-tilled sandy loam with free draining subsoil, belonging to two estates with which I am connected situated on the leeward side of the island of St. Kitt's, were planted with Sea Island cotton. The sowing took place from May to July and the reaping from October to February following. The previous cane crop having been removed, the fields were ploughed and cross-holed, but the cost of these processes is not charged against the cotton as they were necessary for the subsequent cane crop.

The cotton reaped amounted to a little over 200 lb. lint per acre. The actual charges per acre are given below, but

the clearance is to some extent a matter of estimate, though I submit that a selling price of 1s. per lb., having regard to the high character of the cotton, is a moderate assumption. 'Ginning' includes pressing, baling, and material. 'Paris green' was applied pure, as its use without lime was found cheaper and more effective. Cartage in the field and the supervision of the estate staff are not charged, as the expense as against the estate was not thereby practically increased. Half the cost of manure (cattle and sheep dung) for the next cane crop is charged against the cotton, which is also charged with a final weeding and re-crossholing for the same purpose. The land, if kept for cane alone, would have been green-dressed or otherwise manured; the turning in of the cotton bush will partly perform the function of a green dressing. The fields were heavily attacked by the caterpillar but practically free from leaf-blister mite and black boll: the few plants with the leaf blister mite were pulled and burnt. The cotton seed was crushed at the ginny at the local rate and returned to planters. 'Sorting' may in future cost rather more than stated.

Cost of One Acre of Cotton and Estimated Clearance

	£	s.	d.
Cost of seed (Rivers' Sea Island imported)			10
Planting			2
Weedings (six)		6	3
Paris green (pure)		5	0
Applying above			10
Reaping	16	8	
Drying, etc.	1	3	
Sorting	5	7	
Cartage to ginny			2
Pulling and burying cotton bush and re-crossholing	2	6	
Final weeding	1	0	
Manuring for cane crop (half cost)	15	0	
Ginning, etc. (200 lb. lint)	1	5	0
Cartage to port			2
Porterage			3
Lighterage			4
Freight		5	4
Charges in U.K. (Commission, discount, etc., say)	1	0	0
	£ 5	6	5
Deduct value of 575 lb. cotton seed for cattle food at 1c. per lb.	£ 1	4	0
	£ 4	2	5
Value of 200 lb. lint at 1s.	£ 10	0	0
Estimated clearance per acre	£ 5	17	7

I desire to emphasize the point that cotton is treated here solely as a catch crop interposed between the principal cane crops, that is, the cotton must be planted after the removal of the cane and subsequent tillage—the earlier the better—and be reaped before the following cane replant is sufficiently advanced to suffer from the competition of the cotton. Some other land, higher and poorer with clay soil, was cropped with cotton with wretched results: the experiment will not be repeated. I would also observe that our good results were obviously due, to a large extent, to careful cultivation. Some seem

* The use of Paris green without lime is referred to in the *West Indian Bulletin* (Vol. III, p. 328) and the *Agricultural News* (Vol. III, p. 281). [Ed. A.N.]

to regard cotton as a botanical 'pariah' for which anything is good enough. Our season was abnormally dry. I am quite aware that cotton can thrive on a lesser rainfall than sugar-cane, but estates in the same island more favoured with rain seem to indicate that with more moisture we should have done better.

I will not theorize about the effect of cotton on the subsequent cane crop. We at least did not consciously rob Peter to pay Paul, and I would observe that the balance of evidence available to me seems to indicate that, under such conditions as detailed above, the following cane crop is not likely to suffer.

I am, etc.,
(Sgd.) ARTHUR M. LEE.

Bendal's, Antigua, March 27, 1905.

RABBIT KEEPING

Belgian Hares.

In the accompanying illustration (fig. 9) two Belgian hares are shown. The *Senior Country Reader*, III, from which the illustration is taken, contains the following reference to this breed of rabbits:—

It is now stated by competent authorities that the Belgian hare is the best for table use, and the most profitable to rear and market.

The Belgian hare rabbits are large and handsome animals, weighing from 7 lb. to 11 lb. They have prick ears and are of much the same colour and appearance as the hare. They do well in confinement, and do not eat so much in proportion to their size as some of the smaller breeds. Wild rabbits may be greatly improved by turning out amongst them some Belgian hare bucks.



FIG. 9. BELGIAN HARES.

[From *Senior Country Reader*, III.]

Further information as to the characters of the breed will be found in the *Agricultural News*, Vol. III, p. 333. With regard to the choice of breeds for the West Indies, Mr. Barclay strongly recommends the Belgian hare. He says, in pamphlet No. 34, *Rabbit Keeping in the West Indies*:—

The Belgian hare is comparatively common in Jamaica and thrives easily with such ordinary attention as every domestic animal should receive. It is large, not thick-set,

but rather slim and active, of a grey colour deepening to a rich reddish-brown on the back. I have had does weighing 10 lb., but find such not so successful as breeders as those weighing 7 lb. to 8 lb. Bucks I have had to 12 lb. but such size and weight do not fit them for breeding successfully. Bucks from 8 lb. to 10 lb. are as heavy as is desirable.

A year or two ago a Belgian hare craze or fad broke out in the United States, and great sums were paid for show specimens. It is best, therefore, to import from the United Kingdom where more sensible notions prevail in regard to the proper place and value of the Belgian hare. The sum of 10s. is enough to pay there for very good, selected specimens for breeding. In Jamaica, young ones can be had for 4s. and upwards for fair specimens, and 10s. each for a good well-grown buck or doe should secure well-bred stock.

In the preface to the same pamphlet it is stated:—

The Imperial Department of Agriculture has imported a number of these animals, which have been kept with considerable success at the Agricultural Schools at St. Vincent, St. Lucia, and Dominica, as well as at the Experiment Station at Montserrat. The officers in charge of these institutions report that Belgian hares have done well, and that the demand for the young animals is usually in excess of the supply.

SCIENCE NOTES.

Papain.

We extract the following from the *Pharmaceutical Journal* of March 11 last, which, in view of the efforts to establish a papain industry in Montserrat, is likely to be of interest in the West Indies:—

Several interesting experiments on the action of papain have been made by Professor Vines, and the results are quoted in the *Lancet*. The samples of commercial papain tested were obtained respectively from Messrs. Christy, Finkler, and Merck. The action on fibrin of these different samples of papain was not uniform, Christy's proving to be the most active. All the samples of papain tested, however, proved capable of effecting complete proteolysis or, at any rate, peptolysis in various degrees. The action was more vigorous in the presence of hydrocyanic acid than in the presence of toluol, and it was, on the whole, stronger in the alkaline than in the acid liquids, though the difference was not great. The most striking tryptophane reaction was given by Finkler's papain, on account, probably, of its containing the largest amount of readily proteolysable proteid. With respect to the reaction of the liquid, Christy's and Merck's samples gave better results in acid than in alkaline liquids, whilst Finkler's was more active in an alkaline than in an acid medium. Experiments were made also in which the result could be compared between the fibrin-digesting and the peptolysing activity of the papain in each case. The results go to show that the various samples of papain experimented upon differ widely in their general proteolytic activity and in their relation to acid and alkali, as well as to the various antiseptics employed. 'The last word as to the properties of papain will not have been pronounced until a series of careful observations shall have been made with perfectly fresh materials.' The interesting conclusion is suggested that papain contains a fibrin-digesting but not peptolytic protease of the nature of pepsin as well as a peptolytic but not fibrin-digesting protease of the nature of an erepsin. If this be so it will be the first clear demonstration of the existence of a pepsin in the vegetable kingdom.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with the arrangements that the Imperial Department of Agriculture proposes to make for supplying selected cotton seed for planting in the West Indies in 1905. In connexion with this subject we would draw the attention of readers also to the article on Disinfecting Cotton Seed on pp. 101-2.

An interesting contribution by Dr. Francis Watts on muscovado sugar will be found on pp. 98-100. It deals with some of the changes occurring in commercial sugars.

In connexion with the Cotton Industry there are published, in addition to the articles already mentioned, reports on the prospects of the West Indian crop (p. 101) and a letter from a correspondent in St. Kitt's on cotton as a catch crop (p. 102). On pp. 106-7 will be found a detailed account of interesting experiments carried out by Dr. Watts with Rivers' Sea Island Cotton Seed to ascertain the effect, if any, of the fuzziness of some of this seed on the quality of the lint produced from it.

The Insect Note in this issue deals with the use of popular names for insects. Attention is drawn to the confusion that is likely to occur in this connexion.

Reports on the successful Agricultural Shows recently held at Nevis and St. Vincent are published on p. 109; on the next page are reports on the half-yearly examinations at the Agricultural Schools at St. Lucia and St. Vincent.

Department Publications.

With this issue the *Agricultural News* appears with a cover. It has been pointed out that under the old arrangement the outside pages often got soiled and showed signs of travel, which had the effect of spoiling the appearance of the volume when bound. The cover in which it is now proposed to send out the *Agricultural News* will afford the necessary protection.

The index and title page for binding Volume II is issued as a supplement to the present number.

Pamphlet No. 35, *Information in regard to Agricultural Banks*, is also issued to-day. The pamphlet was referred to on p. 50 of this volume. A paper on Rural Agricultural Banks for British Guiana has also been included.

Cassava Poisoning.

At Belmont in the Parish of St. Patrick, Grenada, four children, all of one family, recently died from cassava poisoning. It appears that the father, mother and four children partook of cassava cakes, prepared at home, at 4 o'clock in the afternoon. During the night the children were taken ill and a Doctor was sent for. One child died before the Doctor arrived at 1 a.m.; two died after the Doctor arrived between 2 and 5 a.m. while the fourth died at 6.30 a.m.

The cause of death in all cases was eating 'badly prepared cassava cakes.' No particulars are available as to the kind of cassava, or the method adopted in the preparation of the cakes.

Cassava poisoning has occupied a good deal of attention on the part of the Imperial Department of Agriculture. A leaflet has been prepared for general distribution on the subject. The most recent information is contained in an article that appeared in the *Agricultural News*, Vol. III, p. 423.

Sales of St. Vincent Cotton.

As mentioned elsewhere the first sale of St. Vincent cotton for this year is exceptionally good. The Vice-Chairman of the British Cotton-growing Association writes as follows:—

'The shipments from Messrs. Hazell & Simmons of St. Vincent are quite the best cotton grown under the auspices of this Association, and have been sold at an all-round price of 17d. per lb.'

Further it is stated: 'The West Indies have outpaced the Americans in the cultivation of Sea Island cotton that I am sure every day it will be more difficult to get supplies of good seed from there. West Indian cotton is to-day fetching 2d. to 3d. per lb. over similar qualities of American cotton, and I see from the papers that the American planters are very much alarmed at this, and have had a meeting at which they bound themselves down not to ship any seed to the West Indies.'

Again it is added: 'Judging from the cotton that has been received this year from the West Indies I should say that you have some of the best cultivators in the world. Everybody who comes into these rooms and sees the samples of cotton recently received goes into ecstasies over them.'

Witch Broom Disease of Cacao.

A writer in the Montserrat *Herald* of March 18 gives some account of the dangerous witch broom disease and the causes which have led to its prevalence in Surinam. He states that cacao cultivation is carried on there in lands bordering on some of the great rivers which run through the low, flat country lying between the mountains of the interior and the sea. A great part of this land is below sea-level and is also of a heavy clayey nature.

In consequence of these conditions the soil around the roots of the trees becomes completely water-logged during the most rainy months—May, June, and July—thus preventing the roots carrying on their functions properly. Moreover, a good part of the surface soil is washed away every year into the drains. The rainfall is over 100 inches annually.

The writer also states that the trees on many estates are more than thirty-five years old. This, together with the soil conditions, renders them an easy prey to the fungus causing the witch brooms. The appearance of the disease is described in an article which has already appeared in the *Agricultural News* (Vol. II, p. 117). The flowers of attacked trees are said to fall off, if any fruit is formed it dries up and falls before reaching maturity. As a result of the disease, the writer says, estates which formerly produced 800 to 1,000 bags (of 200 lb.) per year, now scarcely produce 100 to 200 bags.

Ceylon Agricultural Society.

Mainly through the efforts of his Excellency the Governor (Sir Henry A. Blake, G.C.M.G.) an Agricultural Society has been formed in Ceylon. To a considerable extent the Agricultural Society of Jamaica has been taken as a model in establishing this new Society.

The business of the Agricultural Society of Ceylon is conducted through the Board of Agriculture which meets regularly once a month. The Board consists of certain *ex officio* members, including the Director of the Royal Botanic Gardens, the Director of Irrigation, the Conservator of Forests, the Controller of the Experiment Station, and the Superintendent of School Gardens, together with such members of the Society as may be appointed by the President, who is the Governor. As in Jamaica an important feature will be the local societies whose members will receive all publications of the Society on payment of an individual subscription.

It may be mentioned, also, that the *Tropical Agriculturist*, started twenty-four years ago, which has long been well known in all tropical countries, is now to enter upon a new existence. It is to undergo amalgamation and will henceforward be the official publication of the Society with the title *Tropical Agriculturist and Magazine of the Ceylon Agricultural Society*, edited by Dr. J. C. Willis, the Director of the Royal Botanic Gardens. The Society will then have a 'representative organ to justify its existence and to afford necessary information to its members.'

Rubber Planting as an Adjunct to Cacao Cultivation.

In view of the doubts that were expressed by certain members of the recent Agricultural Conference as to the advisability of planting rubber trees among cacao, it may be of interest to give the following summary of an article in the *Tropical Agriculturist* descriptive of cacao cultivation in Venezuela in so far as it has bearing on this point:—

The plantations visited by the writer are among those producing the cacao known as 'Caracas' in the Ocumare valley. Most of these plantations are owned by General Fonseca 'who was among the first to realize the value of giving as shade to cacao. . . . such a tree as *Castilloa elastica*.'

In 1895-6 about 8,000 plants were put out in places where shade was wanted for the cacao. These trees are now some 36 to 45 feet high and have a circumference of 33 inches.

'The experiment is specially remarkable as it shows that the *Castilloa* can be grown among cacao trees without in any way harming their production. Indeed at Ocumare they have noticed no diminution in the number of pods carried by the trees shaded by *Castilloa*, nor any change in the quality of the bean.'

Teaching Agriculture in Elementary Schools.

An address on 'Some Principles of Teaching as applied to Lessons in Agriculture' by Colonel Hicks, Senior Inspector of Schools in Jamaica, to the teachers attending the last annual course of agricultural instruction, has been reprinted, in pamphlet form, from the *Jamaica Journal of Education*. It is mentioned that the Education Department has ordered 1,000 copies with the following prefatory note:—

'This address of Colonel Hicks' is printed and sent out to managers and teachers as being of special interest and value at the present time, when the whole subject of Nature study and agricultural instruction in schools is receiving so much attention.'

Colonel Hicks briefly sketched the rise of what he described as 'the new education,' which 'devotes itself to the arousing of the power of thinking and independent judgement.' He referred to the provision of abundant material for every scholar to handle and observe the things for himself, and the advisability of allowing the children to *perform* experiments.

Jamaica was well forward in the school garden movement. Its teachers must justify the expectations that the agricultural instruction given in these schools should be of marked utility. The subject must therefore be made instructive and educative. This could be done by experiment; by the verification of facts by observing; and by direct instruction. They did not aim at sending out their scholars finished agriculturists, but by no means ignorant of agriculture.

In conclusion Colonel Hicks hoped that what had been predicted of Germany would be true of Jamaica: 'The hour must and will come when the eyes, until now struck with blindness, shall be opened and see that the institution of school gardens has been the greatest blessing of the people.'



INSECT NOTES.

Popular Names.

In dealing with insects, as well as with other animals and with plants, two kinds of names are used, viz., the popular or common name and the technical or scientific name. Scientific names are usually of Latin and Greek derivation and are alike in all countries. That is to say, although an insect may have a different common name in each country or locality where it occurs, the same scientific name holds good in all places. Thus the canna worm of Barbados is the arrowroot worm of St. Vincent, and the same insect is known as the Brazilian 'skipper' in many other places, but entomologists in all parts of the world recognize it under its scientific name *Calpodus ethlius*. The insect which is known in the West Indies as the corn ear worm and in the United States as the fall army worm is *Laphygma frugiperda*. The sweet potato pest, known in the Northern Islands as 'Jacobs,' is known in Barbados as the 'Scarabee,' and its technical name is *Cryptorhynchus batatae*.

On the other hand, the same common name may, in different localities, be applied to different insects. The moth borer of canes in the West Indies is *Diatraea saccharalis*, but in other countries other moths are moth borers. The same is true of the cotton worm. In America and the West Indies the cotton worm is *Aletia argillacea*, but in Egypt and India other caterpillars eat the leaves of cotton and are known as cotton worms.

It does not often happen, however, that insects of entirely different habits are given the same name. An example of this is to be noticed in the West Indian use of the name 'Lady-bird.' In England, America, Australia, South Africa, and other countries where English is the principal language, the term lady-bird is applied to a large family of beetles (Coccinellidae) which, almost without exception, are beneficial in their habits. Lady-birds feed upon other insects such as plant lice and scale insects and only a few of the large number of species in the family have the habit of eating plant food. In the West Indies, however, the name lady-bird is applied to a few members of a large group of beetles (Rhyncophora) which are very different in structure and habit from the Coccinellidae. They are the snout beetles, bill-bugs, and weevils, all having the front of the head prolonged to form a snout or beak with the mouth at the end of it. They are all injurious, feeding on plants, some in fruits, some at the roots, and some in stored seeds, grains, etc. Common examples of this group are the weevil borer of canes and the root borer of canes, the fiddler beetle of Jamaica, the weevil that attacks the roots of orange trees in Porto Rico, the grain weevil, and the rice weevil. It is unfortunate that people should understand this name to refer to such widely different insects, as it will be difficult for those who think of the weevils and borers as lady-birds, to understand the advantage to be reaped from the protection of the highly beneficial insects of the family Coccinellidae, the true lady-birds, which, at considerable trouble and expense, are being introduced into various countries to assist in controlling scale insects.

RIVERS' SEA ISLAND COTTON SEED.

The Hon. Francis Watts, C.M.G., D.Sc., has forwarded for publication the following account of experiments undertaken with a view of ascertaining the reason for the lack of uniformity in the appearance of this imported seed:—

Upon the arrival of the Rivers' Sea Island cotton seed, which, in order to secure the production of the best kind of Sea Island cotton, had been procured by the Imperial Department of Agriculture, it was observed that the seed was not perfectly uniform in character, some seeds were black and free from fuzz, others had a small tuft of fuzz at one, or both, extremities, others again had patches of fuzz on the body of the seeds, while some were fairly covered with fuzz, and, finally, some seeds were completely covered.

This condition gave rise to some inquiry as to the purity of the seed. Sir Daniel Morris was, however, in a position to allay any anxiety by his statement as to the care he had taken to select this seed personally while on a visit to the Sea Islands of South Carolina, the seed being from one of the best-known cotton plantations, well known for its production of fine cotton and for supplying seed which is eagerly sought after by Sea Island cotton planters. The suggestion that the fuzz on some of the seeds indicated an admixture with Upland cotton was negatived by the fact that no Upland cotton is produced in the district from which the seed was obtained.

In order to investigate the character of these various types of seed a quantity of seed was graded into the following classes:—

- | | | |
|-------|------|-------------------------------|
| Grade | i. | Quite free from fuzz. |
| " | ii. | Nearly free from fuzz. |
| " | iii. | Slight amount of fuzz. |
| " | iv. | Partially covered with fuzz. |
| " | v. | Completely covered with fuzz. |

The seed so obtained was planted out on plots numbered i to v, corresponding with the similarly numbered grades of seeds. In addition a plot of $\frac{1}{10}$ acre was planted with seed completely covered with fuzz.

The cotton from these plots has now been reaped and the following facts observed:—

The lints of the five grades present no marked differences. They will, however, be submitted to experts for opinion.

The seed from each grade has been regarded in the following manner. A carefully selected sample of 500 seeds, taken with care so as to represent the bulk, was obtained. These 500 seeds were graded into classes as described above with the addition of a sixth grade for defective or abortive seeds. The results are given in percentages in the following table:—

Seed reaped in 1905 from	Grade i per cent.	Grade ii per cent.	Grade iii per cent.	Grade iv per cent.	Grade v per cent.	Abortive seeds.	Total
Plot i sown with seed of Grade i gave	33.8	47.0	12.4	2.6	.2	4.2	100.2
Plot ii sown with seed of Grade ii gave	12.4	76.4	5.4	2.0	.6	3.2	100.0
Plot iii sown with seed of Grade iii gave	4.0	87.0	4.8	1.8	.6	1.8	100.0
Plot iv sown with seed of Grade iv gave	4.4	85.2	5.2	1.4	1.2	4.0	101.4
Plot v sown with seed of Grade v gave	6.4	73.0	9.0	2.2	3.6	5.0	99.2

It is interesting to note that the seed imported gave the following results upon grading :—

Grade i.	Quite free from fuzz.	5.0	per cent.
„ ii.	Nearly free from fuzz.	60.6	„ „
„ iii.	Slight amount of fuzz.	23.2	„ „
„ iv.	Partially covered with fuzz.	7.6	„ „
„ v.	Completely covered with fuzz.	2.2	„ „
Abortive seeds		1.4	„ „
		100.0	

It is important to note that the seeds from all the five plots consist largely of grade ii, that is, of seeds having a slight amount of fuzz on one or both ends of the seed and this may be taken as the typical character of Rivers' seed.

Considering, first of all, grade v, sown upon plot v, that is, with seed completely covered with fuzz, it is remarkable to note that the product of this plot contains only 3.6 per cent. of seed of the type sown and 73 per cent. of seed having only a very small amount of fuzz. On the other hand, grade i, sown upon plot i, has produced .2 per cent. of fuzzy seed of grade v and 33.8 per cent. of seed without any trace of fuzz: this is a percentage of fuzz-free seed far greater than is found in the product of any of the other grades.

The intermediate grades require little comment, they fall between grades, i and v, and the results speak for themselves. The results obtained on plot i, indicate that, if circumstances warranted the effort, it would probably be a matter of little difficulty to select Rivers' seed in such a manner as to produce a clean black seed absolutely free from fuzz.

Subject to special expert opinion on the lint from the five various plots, the following conclusions appear to be readily arrived at :—

That in the selection of Rivers' seed care has been taken to select for the character of the lint; that small variations in the character of the seed have received less attention, hence the seed is to a certain extent variable in character; that the characters of the seed are not fixed, so that extreme types, such as fuzzy seeds, on the one hand, and absolutely clean seeds, on the other, both tend to produce average seed of the Rivers' type, i.e., having a small amount of fuzz; and, finally, that the character of the lint is fixed and does not vary with the variations in the character of the seed.

As bearing out the foregoing, it may be of interest to reproduce the following letter from Mr. W. A. Orton, the Pathologist, U. S. Department of Agriculture, to the Imperial Commissioner of Agriculture, dated Washington, February 28, 1905 :—

I beg to acknowledge the receipt of your letter of February 17 relative to the quality of Sea Island cotton seed. I have examined the fuzzy seeds enclosed which have been selected from Rivers' Sea Island. This is not an indication of any inferiority, but is, on the other hand, quite characteristic of the Rivers' and some other varieties of Sea Island cotton, which have naturally a small tuft at one end and occasionally produce more fuzzy seeds without having been crossed with other varieties.

The Seabrook cotton, grown by Mr. F. P. Seabrook, of James Island, S.C., one of the best and most productive strains of Sea Island cotton, is especially noted for this fuzzy character of its seeds, though there is no trace of any other Upland characteristics in the plant, and the lint is of fine quality. These fuzzy seeds are slightly objectionable from the ginner's standpoint, as they do not fall through the

grating as freely as the smooth, black seeds, and on this account somewhat retard the process of ginning. On the other hand, many Sea Island planters believe that this green fuzz is correlated with greater productiveness and hardness of the plant than are possessed by seeds entirely destitute of fuzz.

Further evidence that the smooth, black seed is not necessarily correlated with fine qualities of fibre is found in the fact that several varieties of short-staple Upland cotton have a perfectly smooth, black seed, and, second, in the point that is well known to the workers in this Department who have been hybridizing Upland and Sea Island cotton, that among the resulting hybrids the plants with the longest and finest lint have in a majority of cases a fuzzy seed, which must be bred out by selection in order to produce a variety capable of being ginned on the roller-gin.

I may add that I am personally very familiar with Mr. Rivers' fields, and that I have never seen a hybrid stalk in them.

MINOR INDUSTRIES AT NEVIS.

The Agricultural Instructor at Nevis has recently reported to the Imperial Commissioner of Agriculture on the progress of the efforts made to establish minor industries in that island. From his report and the letters of correspondents in reply to a circular letter sent out by Mr. Hollings we gather the following information :—

The district immediately around Madden's has had a serious and long-protracted drought, the rainfall at Madden's having been only 31 inches, compared with 41 on Round Hill, only about 3 miles off. The rainfall generally has been about 15 inches below the average, which has greatly reduced the cane crops for the present season, but seems rather to have helped the cotton and to have kept it free of various pests which the neighbouring island of Montserrat, with a heavier rainfall, has had to combat.

Hitherto, very few of the planters or peasants have grown anything but sugar-cane and sweet potatoes. Efforts are now being made to grow cotton, on a large scale, and cacao, limes, tangerines, onions, and other crops in a smaller way.

The onion crop has been a very good one. One planter has about $\frac{1}{2}$ acre.

The cacao at Madden's has not yet reached the bearing stage, but the trees are in a healthy and promising condition.

A correspondent points out that there is apparently a need of attention being paid to the sweet potato. The quality of the produce is stated to be poor and liable to rot. A trial might be made of some of the varieties that have recently been experimented with in Barbados.

Attempts to grow English potatoes have not been successful, the crop having suffered severely from pests.

With regard to the efforts of the Imperial Department of Agriculture to improve the breeds of poultry, one correspondent writes: 'The breed of poultry is being gradually improved and the introductions will, I think, in time show good results.' Another says: 'Poultry, descendants of the Agricultural Department's Buff Orpingtons, have thriven well with me. This breed has become scattered all over the island, and there is no mistake as to the improvement of the breed of fowls in Nevis.'

It is suggested that the peasants might keep bees and plant sunflowers to help the bees; but more care and attention to the cultivation will be necessary.



GLEANINGS.

The Jamaica Cotton Co. advertises that it will buy all the Sea Island cotton that is produced in the island, and offers 3d. per lb. for good-quality seed-cotton.

According to the *Cyprus Journal*, the Director of Agriculture supplies cotton seed (imported direct from America) on payment or on condition that double the quantity of the seed issued is returned.

According to the *Jamaica Gleaner* there appears to be a likelihood of two factories being established in the parish of St. Elizabeth for the extraction of dye from logwood. St. Elizabeth is essentially a logwood parish.

A local standard for milk will probably be instituted for Jamaica, and the following has been recommended by the Chemist: Total solids, 12 per cent.; solids not fats, $8\frac{1}{4}$ per cent.; fat, $3\frac{1}{4}$ per cent. (*Journal of the Jamaica Agricultural Society*.)

With reference to the note in the last issue of the *Agricultural News* (Vol. IV, p. 92) on the use of bamboo pulp for paper making, it may be mentioned that it is proposed to forward samples of the 'cakes' to the forthcoming Indian and Colonial Exhibition.

At a recent meeting of the Grenada Agricultural and Commercial Society there was a discussion on 'shoes' for cart-wheels. A memorandum, with a sketch of a cast-iron 'shoe,' had been drawn up by the Superintendent of Public Works; it described the best shape of 'shoes' and the correct method of adjusting them.

A former Resident Magistrate of Jamaica (Mr. Justice Thornton) has written from Singapore that a local veterinary surgeon has discovered a drug, which, he believes, will exterminate ticks. 'All I personally know of its efficacy is that it was tried on a dog which was being killed by ticks, and its effect was wonderful.'

As an article of food the chestnut is much more used in Tuscany, where it is made into a cheap kind of cake, than in the south, where the fruit is merely roasted at the street corners in the usual way. The trees grow high up on the mountains, so that the gathering alone is a considerable source of employment to the peasants. (*Consular Report on South Italy, 1904.*)

The first of a series of leaflets, issued by the Department of Agriculture of British East Africa, contains a list of the principal East African cultivated crops with their English and native names. 'Literature on East African agriculture scarcely exists, and it is now proposed to issue occasional leaflets dealing exclusively with facts interesting to the agricultural and general community of this country.'

The first Agricultural Show held in Essequibo (British Guiana) was opened by his Excellency the Governor on March 15. The attendance was large and the show appears to have been a great success.

Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens, Trinidad, has left for England in order to assist with the arrangements for the Trinidad Court at the Colonial and Indian Exhibition to be opened in London in May next.

The *West India Committee Circular* welcomes a new West Indian product—'Barbalene—a natural mineral product which is now being used in the London hospitals, and recommended by skin specialists as a cure for eczema and kindred complaints.' It is said to be prepared from Barbados mineral oil.

The Anglo-Nubian stud goat 'Black Rock' presented to the Department by Lady Burdett Coutts has been sent on loan to Grenada. He was exhibited at the recent Agricultural Show at St. George's, and created a good deal of interest. 'Black Rock' is under the care of Mr. E. M. DeFreitas at Woodlands, about two miles from St. George's.

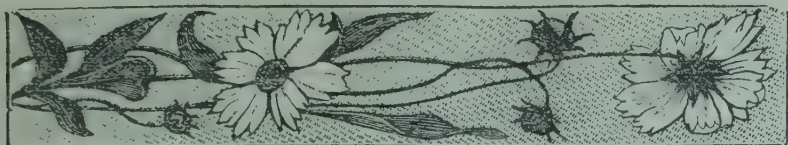
A conference of cotton growers is proposed to be held under the auspices of the Barbados Agricultural Society, at the Planters' Hall on Friday, April 14, at 2.30 p.m. Sir Daniel Morris has promised to attend and deliver an address on the selection of cotton seed and the best time for planting during the coming season.

Messrs. H. W. Frost & Co. quote Sea Island cotton at Charleston as follows: Extra fine, 25c. per lb.; extra-fine crop lots at 26c. to 28c. per lb. From this it will be seen that cotton from the West Indies has been fetching 2d. to 3d. per lb. more than similar grades of cotton from the Sea Islands.

His Excellency the Governor, Sir Gilbert T. Carter, K.C.M.G., on the invitation of the Cotton Committee, visited the Central Cotton Factory at Barbados yesterday in order to witness it in full operation. Latterly, a Christy & Norris disintegrator and a Sea Island cotton press have been added to complete the equipment of the factory which is now one of the best in the West Indies.

Mr. A. J. Brooks writes from the Agricultural School, Dominica: 'I have often seen the yam bean (*Pachyrhizus tuberosus*) described as having white flowers and red seed, but I have never seen any description of the variety commonly grown in this island. Its flowers are dark-blue, and the seed a dark-brown. I am inclined to think that the blue variety is the more prolific. Experiments are now being carried out here to ascertain if this is so. A small quantity of seed of the blue variety could be supplied for distribution.'

The Imperial Commissioner of Agriculture has received from the Hon. H. Hesketh Bell, C.M.G., some beans of a wild vanilla, found growing in the forest near 'Silvania,' Dominica, with a request to be informed if they possessed any commercial value. They are probably produced by *Vanilla anaromatica*, Gr., a species found in Dominica and many of the other West India Islands. This plant is described by Griesbach as having 'capsules 8 inches long, the latter devoid of aroma.' The pods do not appear to contain any seed, only dried, unfertilized ovules. They are of no commercial value.



AGRICULTURAL SHOWS.

St. Vincent.

The Agricultural Show under the auspices of the Imperial Department of Agriculture and a local Committee was held at the Agricultural School on Thursday, March 9.

There was no formal opening of the show, but his Honour the Administrator, and the Imperial Commissioner of Agriculture visited the exhibition soon after it was opened, and inspected the exhibits.

The exhibits of stock were quite up to the usual standard; the entries were more numerous than last year, reaching the satisfactory number of 115. The half-bred Hereford calves, the progeny of the pure-bred Hereford bull belonging to the Imperial Department of Agriculture, were a fine lot, no less than twelve being shown.

As at the last show there was a large number of exhibits of estate produce, such as sugar, arrowroot, cacao, and coffee. The number of exhibits of cured cacao and cacao in pod clearly showed that cacao of good marketable quality can be produced, provided that care is paid to the selection of suitable localities and to cultivation. Messrs. D. K. Porter & Co. obtained the first prizes for muscovado sugar, arrowroot starch, and cured cacao, the prize exhibits in each case being especially good. Taken altogether the display of staple products was very instructive, and did credit to the exhibitors.

As was anticipated, the exhibits of ginned Sea Island cotton were very numerous and quite a feature of the exhibition. Mr. J. S. Richards was awarded the first prize in this section for a very fine sample grown on his estate, Petit Bordel. In all cases, the cotton shown was grown from the selected Rivers' Sea Island cotton seed imported by the Imperial Department of Agriculture, and the Judges experienced some difficulty, owing to the fairly uniform character of the splendid lot of exhibits, in arriving at their decisions.

The school exhibits were not as good as last year, the plants grown in pots being rather poor, but the collection of vegetables from Troumaka and Buccament schools were a very creditable lot, considering that the weather had been dry during the month previous to the show.

In the Lecture Room there were three new features. The first was a collection of the fruits, cacao, and coffee varieties, spices, etc., from the Botanic Station, and also an assortment of some of the economic plants as grown, and available for distribution, such as grafted mango plants, cacao, coffee, nutmegs, eucalypti, kola, guavas, etc.

The second feature was a typical exhibit of fruit and vegetables purchased in the local market, and put up by the Show Committee with a view of educating intending exhibitors at future shows, in the methods of preparing and showing produce to the best advantage.

The third feature was an educational exhibit of 'English Vegetables' by Mr. H. C. Saville showing the right stage to pick bush beans, pull kohlrabi, cut lettuce, etc., and for contrast there were also exhibited samples of these vegetables that had been allowed to grow too old for table purposes. For this exhibit Mr. Saville was awarded a Diploma of Merit.

The show was certainly very successful, as far as the number and quality of exhibits were concerned, and had the weather been fine a larger number of visitors would have been able to put in an appearance.

Nevis.

The prizes won by the exhibitors at the Agricultural Show held at Nevis on February 28 last were distributed by the Acting Commissioner of St. Kitt's-Nevis on March 20. The following is a summary of the remarks which were made on this occasion by the Chairman of the Agricultural Society (the Hon C. A. Shand):—

The members of the Agricultural and Commercial Society decided that the show this year should be taken in hand by the society under the auspices of the Imperial Department of Agriculture. Sir Daniel Morris met the society in a most generous spirit and made a very liberal grant towards the prize funds. His Honour the Administrator, Mr. Bromley, also gave a handsome donation and the Government authorized a grant-in-aid so that from a financial point of view the success of the show was at once assured; but it was not until a much later hour that the show itself gave signs of having excited popular interest. I am thankful to say that the result surprised even the most sanguine, as no less than 711 exhibits were entered, 100 of which were in Class I, Live stock, and 134 in Class IV, Vegetables. Considering the fact that for some time prior to the show the weather had been unpropitious and that misconceptions had arisen as to the real object of the show, I can only congratulate all concerned upon the result achieved which was eminently satisfactory, and I trust that in future years the entries may continue to improve as they should do now that the advantages to be derived by such an institution have been generally recognized. An Agricultural Show is a means of inciting the growers of produce towards a healthy spirit of competition with one another as to who shall be able to grow the best of its kind, and this leads to a further step, that is to say, the ascertaining of the best means by which such prize products can be raised. We have all a great deal to learn as to the most approved processes of agriculture and manufacture, and if we can be roused to the necessity of adopting a more up-to-date system by shows such as the one just held, then a great benefit will have been derived by the community as a whole.

Special Prizes were given by the Administrator, as follows:—

Peasant proprietor winning the greatest number of prizes in the various classes: £2, Henry Moore.

Peasant proprietor winning the next greatest number of prizes in the various classes: £1, divided between James Rogers and Mrs. J. Hutson.

Prizes offered by the Education Department:—

Collection of Plants in pots: 1st., St. Paul's School; 2nd., Wesleyan Chapel, Charlestown; 3rd., St. George's School.

Single Plant in pot: 1st., Wesleyan Chapel, Charlestown; 2nd., St. Paul's School; 3rd., Brown Hill School.

Collection of Vegetables from School Garden: 1st., St. George's School; 2nd., St. Thomas School.

'Diplomas of Merit' of the Imperial Department of Agriculture were awarded to the following exhibitors:—

John Hanley and Joseph Ward, native stallion under three years; George Small, native jack; Fred. Boddie, native jenny; J. E. Jacobs, native tanned leather; H. C. Huggins, pen of sheep and goats; John Evelyn (Maddens), cross-bred poultry; St. Paul's School, plants grown in pots; J. A. Croney, Indian corn; the Rev. W. Cowley, Guinea corn; W. S. Maynard, young mule.

EDUCATIONAL.

Agricultural Schools.

The following are the reports of the examiner (Mr. L. Lewton-Brain) on the half-yearly examination at the St. Lucia and St. Vincent Agricultural Schools:—

ST. LUCIA.

During the greater part of the time between the last examination and the present one, the Officer-in-charge, Mr. J. C. Moore, was absent on leave. The work, however, is of about the same standard as at the last examination. The chief fault is a lack of powers of observation: these should be cultivated. Two of the seniors have left the School since the last examination; there are no other changes in the senior or junior classes.

In the senior class one boy has obtained 75 per cent. of the total marks and two others have obtained more than 60 per cent., the others, except Lake, are between 50 and 60 per cent. The Arithmetic papers are very good; those in Agriculture and Geography are also good. The Chemistry papers are only moderate, while those in Botany are distinctly poor. I drew attention to this weakness in Botany in my report on the last examination and wish now to emphasize my remarks made then.

Flavien has done better than at the last examination and now comes at the head of the class; Goring is second, he is slightly better in the Chemistry and Botany papers than Flavien, but not so good in Agriculture, Arithmetic, and Geography. Edgar has improved since the last examination. Lake, who was last in June, did not take two of the papers this time, his other papers are still weak.

In the junior class, Raveneau has done worse than at the last examination; the other three boys have done fairly well and there is not much difference between them.

The seven 'new boys' have taken junior papers in Dictation, Arithmetic, Geography, and Composition. Their work in Dictation and Arithmetic compares fairly favourably with that of the junior class; in the other two subjects they are not so good. There is not much to choose between them, but Regis seems slightly better than the others.

ST. VINCENT.

Since the examination in June last, seven of the nine senior boys have left the school; the present senior class consists of the two remaining boys of the old class and six promoted from the junior. In the junior class only two boys took papers at the last examination. Between the two examinations, also, the late Resident Master, Mr. C. H. Knowles, B.Sc., left the school, and his place was temporarily filled by Mr. A. J. Clarke. Under these circumstances it was not to be expected that the same standard of results would be reached as at previous examinations.

In the senior class the results are distinctly satisfactory, all the boys having obtained over 50 per cent. of the total marks, though only one has obtained 75 per cent. The papers in Agriculture are the best among the more important subjects, the Arithmetic and Geography papers are also good; the worst papers are in Chemistry and Botany, showing a distinct falling off from the standard of the last examination. One fault is a tendency to verbosity, by which some of the boys (in both classes) have lost marks both directly and also indirectly by not giving themselves time to answer the whole of the questions. Trotman, although he has not done quite so well as at the last examination, still maintains his position at the head of the class. Yorke, who has been

promoted since the June examination is second and has sent in some good papers. Ollivierre is at the bottom of the class, having obtained only just over 50 per cent. of the total marks.

The results in the junior class are not so good as in the senior; this class requires more attention. Considering the length of time the boys have been at the school, however, the results may be considered satisfactory. Henderson is the best with 60 per cent. of the possible marks, and Byron, one of the new admissions, comes next. The papers have been marked leniently.

Trinidad.

The following note on the progress of agricultural education in Trinidad is extracted from the *Annual Report* on the colony for 1903-4:—

During the year under review 180 schools were examined in agriculture, as against 152 in 1902-3. Of the former number thirty schools obtained the highest award 'very good,' and 104 were classified as 'good.' It has been widely recognized by those responsible for elementary education in the colony, not only in connexion with the Government, but also in the assisted schools, that the object of the instruction afforded, apart from the widening of the mind and the strengthening of the character of the pupils, should be to fit the children for the practical work of life. Trinidad is, and must remain, primarily an agricultural colony, and it would be deplorable if the effect of an improved system of education were to be to inspire in the rising generation a certain disgust with the agricultural pursuits in which the children's parents have been engaged, and a desire to earn a living only by means of clerical employment. That this is a danger cannot be denied, and already the ranks of those seeking work as clerks and the like are much overcrowded.

Great importance, therefore, is to be attached to the efforts which are being made in educational circles in this colony to afford sound, practical instruction to the pupils of the schools on subjects relating to agriculture; to impress upon the children the dignity and the value of agricultural pursuits; and to instil into them the fact that it requires trained intelligence, and that of no mean order, if a man is nowadays to become a really successful tiller of the soil. This is the object of the prizes offered for the exhibitions of agricultural products grown in the gardens attached to the schools; while the frequent lectures given all over the colony by the staff of agricultural instructors attached to the Botanical Department, the bi-weekly lectures on agricultural chemistry delivered at the Port-of-Spain Training School by the Government Laboratory Assistants, the periodical visits of the Assistants of the Botanical Department to the various schools to afford advice and instruction in matters agricultural, and the prominence which is now given to this subject in the school life of a large number of pupils are tending, it is hoped, toward the desired end.

White Pigeon Peas. Reporting on the recent Agricultural Show at St. Vincent, Mr. W. N. Sands writes: 'Of especial interest were the two exhibits of dried White Pigeon Peas, shown by Mr. J. E. S. Richards and Miss Huggins. These peas, which come true from seed, and have the appearance of dried English garden peas, are a desirable acquisition, as when cooked they still retain their clear white character, and are a decided improvement on the ordinary variety. This pea is well worthy of extended cultivation, and efforts will be made by the Agricultural Department to make it more generally known.'

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice market for the month of February:—

It will have been noticed that for some time past our reports on the London drug markets have indicated a condition of inactivity that has scarcely been relieved by the ordinary fluctuations due to the exigencies of supply and demand, let alone by the recurrence of those unusual features which have been known to produce excitement in special products. The writer of a very important article that appeared in the *Pharmaceutical Journal* for February 25 last, under the head of 'London's position as a Drug Market,' suggests that this dullness of the auctions is an indication of a change in the character and nature of the markets that is likely to become permanent. The writer attributes the decline to the fact that other ports are now receiving direct shipments of drugs which fifteen years ago all came to London and states that there is every indication that such shipments to foreign ports will increase rather than diminish.

Looking back only a matter of fifteen years or so we find that, as far as the drug trade is concerned, the best part of the world's drugs came to London in the first place. Little by little this is changing, and we now find that direct shipments are going to other ports. For instance, it is only in recent years that opium has been shipped direct from Turkey to the United States of America, that ipecacuanha has reached Hamburg and Paris direct without touching London, that Japan and China produce has gone to Hamburg before coming to London. Marseilles has only recently become the chief market for gum arabic, run close by Trieste. These are only a few examples which illustrate only too well the direction things are taking. These changes are easily explained: shipping facilities are infinitely greater than they used to be and are still increasing; continental banks support and influence industries to a much greater extent than English banks; the travellers for continental manufacturers are found all over the world and the goods are paid for in produce which is shipped direct to continental ports. The conclusion arrived at by the writer is that drugs will continue to reach these shores direct in smaller quantities, but that in the face of twentieth century competition, collectors and shippers will, sooner or later, realize that by shipping direct to the consumer and avoiding the middleman they reap a larger profit, the difference being the amount of the London charges for handling these goods.

With regard to West Indian produce in the London market during February, the following is a summary:—

GINGER.

Throughout the month this article was in very small demand and prices ruled low. On the first of the month at the spice sales, 11 cases of medium and bold native-cut Cochin realized 43s. to 46s. per cwt. Fair limed Japanese was sold at 17s., at which rate 20 bags were disposed of. A week later new crop rough Calicut was bought in at 22s., washed rough and cuttings at 20s. At this auction small sales of Jamaica were made at the following rates: Low to middling 32s. to 37s., and small dull 29s. On the 15th. prices had somewhat declined; brown Calicut was quoted at 28s. for small and medium native-cut, and 32s. for medium; wormy and washed rough Cochin and Calicut were sold without reserve at 13s. to 14s.; common small Jamaica

fetched 28s. 6d. and middling washed 37s. to 38s.; for limed Japan 16s. was the price quoted. At the concluding sale of the month, ginger had a dull tone generally; Calicut and Cochin were rather lower in price while a few packages of good ordinary Jamaica were disposed of at 34s. and good bright small at 37s.

NUTMEGS, MACE, PIMENTO, AND ARROWROOT

At the first sale nutmegs were quoted at somewhat lower rates than in the previous month. The prices for mace being for fair palish West Indian 1s. 3d. to 1s. 4d. per lb.; fair reddish partly broken 1s. 2d. and pickings 1s. Little or no change in these prices took place during the remainder of the month.

A few bags of pimento were disposed of at the first sale at 2½d. per lb. and this price remained steady through the month. Arrowroot attracted little or no interest and when offered was mostly bought in.

SARSAPARILLA.

At the first drug auction on the 2nd. Jamaica realized 1d. per lb. in advance over last month's quotations, 1s. 2d. being paid for sound roughish and 1s. 1d. for sea-damaged; two bales of grey Jamaica were also disposed of at the latter price, while for ordinary dull mixed and sea-damaged native 6d. to 6½d. was obtained. At the second sale on the 16th. no grey Jamaica was offered, but of rough Lima-Jamaica 11 bales were sold at 9¼d. to 10½d. per lb. Towards the close of the month it was reported that there was no grey Jamaica to be had first-hand and second-hand holders were asking 1s. 3d. per lb. The latest quotation of Lima-Jamaica was 11d.

LIME JUICE, ANNATTO, MUSK SEED, ETC.

Of other West Indian products the following may be noted as occurring during the month, in the early part of which a hogshead of concentrated West Indian lime juice was offered and sold at £13 10s. per pipe. Fair bright Maltese strip orange peel was also offered and disposed of at from 9d. to 10d. per lb.

Of 55 parcels of annatto seed offered in the early part of the month none were sold, the highest bids being 4d. per lb. for good bright red Madras slightly damp. A few lots of these were, however, sold a week later at 5d. per lb.

Some fine bold musk seed, from Martinique, said to have been of fine aroma were also offered and 3s. 2d. per lb. asked. On the 16th. of the month 3 bags of bold dark washed West Indian kola nuts realized 4½d. per lb.

Fair palish unworked Dominica lime juice in hogsheads was sold at 10½d. per gallon and 1 hogshead of concentrated lime juice also from Dominica was limited at £13 10s. per pipe. Tamarinds were offered to the extent of some 67 packages; a small quantity of fine bold dry from Barbados being disposed of without reserve at 8s. 9d. to 9s. per cwt. in bond.

Rabbits Wanted. A correspondent in British Guiana desires to obtain from some reliable rabbit keeper in Barbados the undermentioned animals:—

- Two pure-bred Belgian hare bucks;
- One " " " doe;
- One pair pure-bred Flemish Giant.

Rabbit keepers willing to supply these rabbits should communicate with the Imperial Commissioner of Agriculture, stating the cost put up in secured and addressed boxes and placed on board one of the schooners sailing for British Guiana.

MARKET REPORTS.

London,—March 14, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 10, 1905; and 'THE PUBLIC LEDGER,' March 11, 1905.

ALOES—Barbados, 15/- to 40/-; Curaçoa, 15/- to 45/- per cwt.
 ARROWROOT—St. Vincent, 1½d. to 1¾d. per lb.
 BALATA—Sheet, 1/1 to 1/11; block, 1/6 per lb.
 BEES' WAX—£7 10s. to £7 17s. 6d. per cwt.
 CACAO—Trinidad, 55/- to 60/- per cwt.; Grenada, 51/- to 54/- per cwt.; Jamaica, 48/- to 53/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 2/- per lb.
 COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
 COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—4/6 per bunch.
 GRAPE FRUIT—12/- to 14/- per box.
 ORANGES—9/- to 11/- per case.
 PINE-APPLES—St. Michael's, 1/9 to 4/- each.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, bright small, 35/6; mouldy, 31/6 per cwt.
 HONEY—Jamaica, 16/- to 17/- per cwt.
 ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 1/- to 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 9d. to 10d. per gallon; concentrated, £14 5s. to £14 10s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/4 to 1/5 per lb.
 LOGWOOD—£4 to £4 15s.; Roots, £3 10s. to £4 per ton.
 MACE—Fair red to pale, 1/2 to 1/4; broken 1/1 per lb.
 NITRATE OF SODA—Agricultural, £11 per ton.
 NUTMEGS—67's, 1s. 2d.; 80's, 10d.; 128's, 5½d. per lb.
 PIMENTO—2¾d. to 2½d. per lb.
 RUM—Demerara, 1s. 2½d. to 1s. 4½d. per proof gallon; Jamaica, 2s. per proof gallon.
 SUGAR—Yellow crystals, 21/- to 23/- per cwt.; Muscovado, 18/- to 19/- per cwt.; Molasses, 15/- to 19/- per cwt.
 SULPHATE OF AMMONIA—£13 2s. 6d. per ton.

Montreal,—February 10, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

BANANAS—No quotations.
 CEDAR—No quotations.
 COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.
 COFFEE—Jamaica, medium, 9c. to 9½c. per lb.
 GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 28c. to 30c.; Antigua, 23c. to 25c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 19c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5½c. to 5¾c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey Crystals, 96°, \$3.65 to \$3.75 per 100 lb.
 —Muscovados, 89°, \$2.90 to \$3.00 per 100 lb.
 —Molasses, 89°, \$2.65 to \$3.75 per 100 lb.
 —Barbados, 89°. No quotations.

New York,—March 3, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.
 COCOA-NUTS—No quotations.
 COFFEE—Jamaicas, 8c. per lb. (ex store).
 GINGER—Jamaica, 5½c. to 5¾c. per lb.
 GOAT SKINS—Jamaicas, 57c. per lb.
 GRAPE FRUIT—Jamaicas, \$3.00 to \$4.50 per barrel.
 ORANGES—Jamaica, \$3.00 to \$3.50 per barrel (stem cut).

PIMENTO—4½c. per lb.
 SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4½c.
 Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 22, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—21c. per gallon, package included.
 SUGAR—\$2.80 per 100 lb. 89°

Barbados,—March 25, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.
 CACAO—Dominica, \$10.00 to \$10.50 per 100 lb.
 COCOA-NUTS—\$14.00 per M. for husked nuts.
 COFFEE—\$11.50 to \$12.00 per 100 lb.
 HAY—96c. to \$1.00 per 100 lb.
 MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00.

MOLASSES—21c. per gallon.
 ONIONS—Teneriffe, \$3.15 per 100 lb.
 POTATOS—ENGLISH, \$1.68 to \$2.16 per 160 lb. (retail).
 RICE—Ballam, \$4.40 to \$4.75 per bag (190 lb.); Patna, \$3.25 per 100 lb.
 SUGAR—Muscovados, 89°, \$2.55; Dark crystals, 96°, \$2.95 per 100 lb.

British Guiana,—March 23, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
 CACAO—Native, 13c. to 14c. per lb.
 CASSAVA STARCH—\$5.00 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Rio and Jamaica, 14½c. to 15c. per lb. (retail).
 —Creole, 12c. to 14c. per lb.
 DHAL—\$4.25 to \$4.50 per bag of 168 lb.
 EDDOES—\$2.16 per barrel.
 MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).
 ONIONS—Madeira, 3½c. to 4c.; Lisbon, 4½c.; Garlic, 5½c. to 6½c. per lb.
 PEA NUTS—American, 5½c. per lb. (retail).
 PLANTAINS—24c. to 60c. per bunch.
 POTATOS—ENGLISH, Picked, \$2.60 to \$2.75 per barrel.
 RICE—Ballam, \$4.30 to \$4.35 per 177 lb.; Creole, \$4.00 per bag.
 SWEET POTATOS—Barbados, \$1.20 per bag; \$1.20 per barrel.
 TANNIAS—\$2.40 per barrel.
 YAMS—White, \$1.92 per bag.
 SUGAR—Dark crystals, \$3.27½; Yellow, \$4.25 to \$4.30 White, \$4.90 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—March 23, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$11.90 to \$12.00; estates, \$12.25; superior plantation, \$12.50 to \$13.25 per fanega (110 lb.); Venezuelan \$12.25 to \$12.60 per fanega.
 COCOA-NUTS—\$20.00 per M., f.o.b.
 COCOA-NUT OIL—75c. per Imperial gallon (casks included).
 COFFEE—Venezuelan, 9c. to 9½c. per lb.
 COPRA—\$2.90 to \$3.00 per 100 lb.
 MOLASSES—20c. per gallon.
 ONIONS—Teneriffe, \$1.75 to \$2.25 per 100 lb. (retail).
 POTATOS—ENGLISH, \$1.25 to \$1.35 per 100 lb.
 RICE—Yellow, \$4.25 to \$4.40; white \$4.75 to \$5.75 per bag.
 SUGAR—White crystals, \$4.50; yellow crystals, \$3.75 to \$4.00; molasses sugars, \$2.75 to \$3.75 per 100 lb.



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Ratooning Sea Island Cotton.

At a Conference of cotton growers held at Barbados on April 14 last, an interesting discussion took place in regard to the desirability or non-desirability of ratooning Sea Island cotton.

To 'ratoon' is well known in the West Indies. For instance, sugar-canes are ratooned when the ripe stems are cut, and the stools left in the ground are allowed to throw out fresh stems to be reaped at the end of the following season. The yield from ratooned canes is not nearly so large as from the plant canes, but planters in certain districts are compelled to adopt the system in spite of the drawbacks attached to it.

With Sea Island cotton the case is entirely different. This special variety, evolved by careful selection and cultivation, has, for a long period, been treated as an *annual*, and the plant has apparently become generally adapted to that routine. The best results are therefore to be looked for when it is dealt with in accordance with its accustomed habit.

There is also a further point to be considered, and that is the susceptibility of so highly cultivated a plant to the attacks of insect and fungoid pests. The longer the period during which the plant is exposed to its enemies the more severely it is likely to suffer from them.

As the result of the experience acquired during the last three years, and following also the practice of cotton growers in these islands more than 100 years ago, it has been found that the best time to plant Sea Island cotton is soon after the rains, expected about the end of May or beginning of June. When, as sometimes happens, these rains are light or are followed by spells of dry weather, the cotton plants are likely to suffer, and, under exceptional circumstances, it may become necessary to replant in July or August. But, taking

the average of years, it is probable that cotton planted between the beginning of June and the end of August is likely to obtain favourable conditions, and the planter, each in his own district, must determine the right time to sow.

Cotton planted, say, in June to August should yield the first pickings of seed-cotton from October to December and the second pickings from February to March or April. Thus the cotton crop may occupy the land from June to the end of January under one set of conditions or from August to the end of April under other conditions, depending on the time of sowing and the character of the season.

The point that it is desirable to impress upon all planters of Sea Island cotton is that whether the second pickings come to an end in January or in April, it is important that the fields should then be cleared of all cotton plants, which should be burnt or buried, whichever is more convenient. In some cases the cultivation is merely abandoned and stock turned into the fields. Where the leaf-blister mite, black boll, and other diseases are prevalent, this is not sufficient, as the cotton plants still left, and diseased, may infect all newly planted areas in the neighbourhood. This subject is discussed in the following extract from a report by Mr. Ballou after a visit to Montserrat in 1903:—

I have carefully discussed the matter of ratoons and believe that every effort should be made to persuade all cotton growers to cut and to burn carefully all cotton plants as soon as the present crop is harvested. I talked also with several peasant proprietors and they all expressed their willingness to follow the advice of the officers of the Imperial Department of Agriculture and the example of the managers of the estates in the island.

There are several points in favour of entirely replanting fresh areas, which should be prominently brought forward in a discussion on the matter of ratoons:—

(a) Some time will elapse between the end of the present crop and the next planting season. If all cultivated cotton be carefully destroyed as soon as the crop is harvested, the leaf-blister mite will be deprived of its lodgement in the fields and probably be greatly reduced in numbers on the next crop. Ratoons are also breeding places for scale insects and other pests.

(b) Planting is not expensive, and good seed can be obtained at a very low cost.

(c) Mr. Watson is of opinion that the fibre produced by

ratoons is less in quantity than, and of inferior quality to that produced by plant cotton.

(d) All cotton seed used in planting the next crop should be treated with carbon bisulphide. This will prevent the introduction of new pests with imported seed, and destroy any which may be harbouring in the seed raised on the island.

In clearing the present cotton fields great care should be exercised to remove every plant and all pieces should be picked off the ground and burned. I noticed that labourers are often careless, and unless continually watched, will leave a great deal of infested material lying about. In the case of a very extreme infection, the land might be scorched over by covering it with cane trash and burning. This would produce sufficient heat to destroy the weeds, and a very large proportion of the mites, and would probably not seriously reduce the amount of humus in the soil.

In closing, it may be useful to reproduce what was stated upon the same subject in the *Agricultural News*, Vol. IV, p. 66:—

It is strongly recommended that all the cotton fields on the Windward and Leeward Islands be cleared, and that the refuse [buried or] burnt, by the end of May, or at all events before the new crop appears above ground. It is only by such means that the mite, rust, mildew, and other pests can be kept in check and the cotton plants generally maintained in a healthy condition. The soundness of this advice has been abundantly proved during the last two years. Wherever an attempt has been made to ratoon cotton, that is to carry over from one season to another, the result has been uniformly unsatisfactory. The plants have been weak and sickly, and the quality of the fibre has been impaired. This was specially dwelt upon by Mr. E. L. Oliver during his recent visit to the West Indies. *It would appear, from the experience of recent years, that the finest sorts of Sea Island cotton can only be produced in these islands by annual sowings in fresh soil.*



SUGAR INDUSTRY.

Observations on Muscovado Sugar.

The following is the second part of 'Some observations on Muscovado Sugar' by the Hon. Francis Watts, C.M.G., D.Sc., Government Analytical and Agricultural Chemist for the Leeward Islands. The first part was published in the last issue of the *Agricultural News*. Part II deals with:—

THE SAMPLING OF MUSCOVADO SUGAR.

Muscovado sugar is frequently 'potted' directly into bags, that is, the massecuite is placed in the bags and allowed to drain there, the sugar being shipped in the bags in the condition in which they remain after the molasses have drained away. It therefore follows that the sugar at the top of the bags is dry and free from molasses, while that at the bottom is wet and almost saturated.

It appeared of interest to ascertain the polariscopic test of the sugar at various points in the bag and to ascertain also the true average test after carefully mixing the whole of the contents.

A bag of sugar was therefore selected and examined in the following way. By means of sampling irons or tryers, of the official pattern prescribed by the United States Government, samples were taken at a distance of every 3 inches from top to bottom of the bag. The bag was standing upright, and the tryer was driven horizontally right through the bag from side to side so as to pass through the middle line in each case. In this manner eleven samples were drawn, but only ten successfully, the awkward position from which the eleventh sample was taken caused some loss and the sample was rejected. A sample, No. 14, was then taken by driving the long tryer from *bottom to top* of the bag in the middle line (to effect this the bag was placed on its side); another similar sample, No. 15, was taken in the reverse direction, namely, from the *top to the bottom*. A sample, No. 1, was taken from the extreme top, and another, No. 13, from the extreme bottom. After the samples had been taken, the sugar was all removed from the bag and carefully mixed by turning over with spades, the heap was then quartered, the alternate quarters rejected, and the remainder mixed and quartered, the operations being repeated until a small laboratory sample (No. 16) was secured. The results obtained on testing the samples are given below:—

No.	Description of Sample.	Polariscopic test.
1	Sample taken from actual top of bag.	87.7
2	Sample taken 3 ins. from top of bag.	87.3
3	" " 6 " " " " "	87.3
4	" " 9 " " " " "	87.0
5	" " 12 " " " " "	86.6
6	" " 15 " " " " "	86.3
7	" " 18 " " " " "	86.1
8	" " 21 " " " " "	85.8
9	" " 24 " " " " "	85.6
10	" " 27 " " " " "	85.5
11	" " 30 " " " " "	85.3
12	" " 33 " " " " "	(?) *
13	Sample taken from actual bottom of bag.	83.6
14	Sample taken from end to end, starting from bottom.	85.5
15	Sample taken from end to end, starting from top.	86.3
16	Average sample of bag.	86.6

The bag of sugar selected proved to contain 'gummy' sugar of the kind described in the former part of this paper: the average test was rather low, and possibly drainage had not been very perfect. In this case the average test was

* This was imperfectly sampled owing to position: as the sampling iron was withdrawn a portion dropped. A second sample was taken with little better success, the sample was therefore rejected.

afforded by the sample taken 12 inches from the top of the bag. It is possible that in a drier and less 'gummy' sugar the average test would be given by a sample taken somewhat lower.

The difference in test between the sample No. 13, taken from top to bottom, and No. 14, taken from bottom to top, is instructive as showing that when taking a long sample there is a tendency for sugar to fall from the distant end of the tryer as it is withdrawn so that the resulting sample errs by falling somewhat closer to the condition of the bulk at the point where the tryer is inserted rather than representing a true average, a point to be kept in mind when sampling a bulk which varies greatly and progressively along the line in which the sample is to be taken.

Science and Sugar Production.

The U.S. Consul-General in Berlin reports in the *Louisiana Planter* the opening of a new Beet Sugar Institute in that city on May 8. After giving figures to show the extraordinary rise of the beet sugar industry, he says:—

It is recognized here, above all, that the abolition of export bounties by the Brussels Conference ended definitely a long and important chapter in the history of beet sugar production and that the industry, deprived of that form of artificial stimulus, must henceforth work out its own future upon new and independent lines. It is to be a battle in which scientific methods, profoundly studied and skilfully applied, alone can win. To concentrate all the light which science can give upon the task of producing most economically from a given area of land the largest weight of beets with the highest percentage of saccharine element, to harvest the crop, extract, cleanse, and evaporate the juice, and to conduct each step of the process down to the marketing of the refined sugar with the utmost skill and avoidance of waste—this is the lesson which the new institute is designed and equipped to teach. The day of hit-or-miss fertilizing of beet lands—if, indeed, it ever existed in Germany—is definitely past. The successful sugar grower and manufacturer of the future must have at their command and utilize constantly, patiently, and skilfully all that science and experience can teach of correct methods and consummate management.

VEGETABLE PRODUCTS OF THE WEST INDIES.

We extract the following from the 'Proceedings of the Scientific Committee' published in the *Journal of the Royal Horticultural Society* for December 1904:—

On June 28, 1904, Sir Daniel Morris, K.C.M.G., gave an interesting account of the cultivation and introduction into the English markets of new fruits now being raised. Thus, the Litchi has been brought fresh from Trinidad; its cultivation requires alternations of bright sunshine and water, so that its success depends upon artificial irrigation in the dry season. Mangos can now be also imported fresh, as well as much-improved Smooth Cayenne pine-apples, of the type grown in St. Michael's, the average price being 4s. Bananas, usually imported from Jamaica and Costa Rica, are now received from Barbados. The fruit is of the dwarf species, *Musa Cavendishii*. They realize 5s. in England, the price at home [in Barbados] of a bunch being 1s. They are packed in paper and cotton-wool, with the soft part of the leaves.



WEST INDIAN FRUIT.

BARBADOS BANANAS.

Through the courtesy of Messrs. W. Pink & Sons we are enabled to reproduce in the *Agricultural News* a series of photographs illustrating the growth of bananas in Barbados and the method of shipping them to England.



FIG. 10. BARBADOS BANANAS.

The above illustration (fig. 10) shows a growing plant of this variety. As has been mentioned before, it is the variety known as the Chinese banana (*Musa Cavendishii*) and is the same as that grown in the Canary Islands.

The number of bunches shipped from Barbados by the Imperial Department of Agriculture during the

last three years has been as follows: 1902, 18; 1903, 6,691; 1904, 15,326. By R.M.S. 'Trent' on March 1, 1905, 1,922 bunches were shipped.

It may be of interest in this connexion to publish the following letter to the local press of March 28 from Mr. J. R. Bovell, Agricultural Superintendent Barbados:—

I should be much obliged if you would be so good as to allow me to state for the information of banana shippers that I received a telegram this morning from Messrs. W. Pink & Sons informing me that the bananas shipped by the R.M.S. 'Atrato' on March 11 last had arrived in England in perfect condition, and advising me to ship as many bunches as I could.

YIELD OF VANILLA.

A press bulletin of the Agricultural Experiment Station on vanilla cultivation in Hawaii gives the following estimate of the probable yield of this product and the profits that are likely to be obtained:—

This has never been properly ascertained in Hawaii. The wild vanilla plant of Mexico bears one, two, and rarely three pods, all of superior quality. Two cultivated and hand-pollinated plants at Moanalua, Oahu, produced 300 pods in 1902, and 150 pods in 1903, about one-fourth being of good size and quality. This only indicates what may be accomplished by cultivation, but is neither practicable nor advisable on a large plantation. Plants yielding a very heavy crop may become exhausted. The root, and sometimes the stem, rots away, or the vines turn yellowish green, the leaves become soft and white, the tendrils dry, and the whole plant dies.

A yield of ten pods for ordinary, and twenty or even twenty-five pods for strong, healthy plants, should be a safe limit. On a basis of ten pods per plant, two plants to each support, and 680 supports per acre, a yield of 13,600 pods would be secured. One thousand average good pods weigh 45 lb., and dry to half their volume and about one-fifth the weight during the curing process; 13,000 pods weigh 585 lb. and the finished article about 120 lb. At least one-half of this should be of superior quality and sell for from \$6 to \$10 per lb., f.o.b. Honolulu. The balance would bring from \$1.25 to \$4 per lb. This would give a return of not less than \$435 per acre. This, however, can be accomplished only when a fair portion of the finished article is of superior quality.

THREAD DISEASE OF CACAO.

In a previous issue of the *Agricultural News* (Vol. III, p. 281) mention was made of a new disease then recently reported on cacao on one estate in St. Lucia. Information was asked from readers of this journal as to whether the disease occurred in any other localities and as to what (if any) wild trees or bushes it attacked. The agricultural officers in the different cacao-growing islands were also asked to obtain information on these two points.

It was mentioned that there were two forms of the disease, namely, the 'thread' and the 'horse hair.' It is possible, though not likely, that the two forms are two distinct diseases. The thread blight is the more destructive of the two forms.

At the Agricultural Conference held at Trinidad in January, a short note was read by Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist on the staff of the Imperial Department of Agriculture, dealing mainly with the thread disease; the full note will be published, together with other Conference papers, in the *West Indian Bulletin*. Great interest appeared to be taken by delegates in the presence of a hitherto unrecorded disease of cacao in the West Indies. Specimens were exhibited by Mr. Lewton-Brain and by Mr. G. S. Hudson, the Agricultural Instructor at St. Lucia. Subsequently, the disease has been reported from a cacao estate near Sangre Grande, in Trinidad; it is now known also on another estate in St. Lucia. Quite recently Mr. A. W. Bartlett, Superintendent of the Botanic Gardens in British Guiana, has reported the discovery of this disease on a neglected estate on the Demerara river.

In St. Lucia the manager of the estate where the disease was first noticed states that the damage done was very considerable, and both he and Mr. Hudson report that the fungus quickly kills every young twig and every leaf it touches. In Trinidad the damage is said not to be very severe.

The fungus of the thread blight appears as dark-brown, branching strands running along the twigs, so closely attached to the bark that they cannot be removed without tearing this away. The young threads are white and more delicate. A thread will pass along the short leaf-stalk and when it reaches the blade, will branch out into fine threads, which at first follow the main ribs of the leaf.

The threads are composed of numerous closely woven, but for the most part parallel, hyphae of a fungus. From the under side of the threads are given off numerous single hyphae which grow into the crevices of the bark. These hyphae seem unable to pierce a well-formed cork layer, but can enter a very young twig; when they do so the cortex is destroyed. The tissues of buds and leaves are also entered and destroyed.

Mr. Hudson reports that in St. Lucia the fungus appears on a great variety of forest trees, including 'pois doux' (*Inga laurina*), 'bois de basse' (*Calyptranthes sericea*), and 'bois creole.' In Trinidad the fungus attacks the 'immortel' tree used for shade.

The fungus probably spreads mainly by means of its mycelium, attached to bits of dead twigs, leaves, etc. Birds may carry the strands from one locality to another.

In St. Lucia the disease, where it has been noticed, has been stamped out by prompt and thorough pruning. So much so, that in January it was not possible to get specimens of diseased cacao twigs for exhibition. The specimens exhibited by Mr. Hudson at the Agricultural Conference were taken from the wild host plants. It is to be hoped that similar prompt measures will be taken wherever the

disease is noticed, as there can be little doubt that, when neglected, great damage may be done very quickly.

It is of importance that the distribution of the disease in the West Indies should be known as accurately and fully as possible. If any of our readers should notice it either on cacao or on any of its wild host plants, it is requested that they will communicate immediately with the local officers of the Imperial Department, giving all the information possible as to damage done, external conditions, affected locality, etc. Dried specimens of diseased twigs and leaves should also be sent for examination at the Head Office.

Though pruning, so far, has proved an efficient treatment for this disease, there may be cases where this would have to be too severe for the health of the trees; fungicidal treatment might prove successful and is recommended for trial. A similar disease of tea in India, known also as 'thread blight' has been shown to yield to treatment with a lime-sulphur wash; full particulars of this wash can be obtained on application to the Head Office, Barbados.

DOMINICA.

Hints to Intending Settlers.

The following circular, signed by the Secretary of the West India Committee, has been sent to the heads of some 200 schools and colleges in England. The publication referred to was issued as No. 24 of the pamphlet series of this Department:—

I beg to send you herewith a copy of a pamphlet entitled 'Dominica: Notes and Hints to Intending Settlers,' compiled by his Honour H. Hesketh Bell, C.M.G., Administrator, which deals very fully with the advantages offered by that island to young and active men with a moderate amount of capital at their command.

May I ask you to be good enough to bring this small book before the notice of such of those with whom you are in contact, who are considering the career upon which they will enter after the termination of their studies?

Already, during the past few years, a large number of settlers of the best class have devoted themselves to the cultivation of cacao, limes, and rubber in this beautiful island, and it is with a view to increase this number that I venture to trouble you, and I shall be glad to know if the action we are taking meets with your approval.

I need hardly add that I shall be most happy to answer any inquiries which you may wish to make regarding this fertile colony.

TOBAGO STOCK FARM.

The Government Stock Farm at Tobago contains the following stud animals:—

1. Government stallion (thoroughbred), 'Serpa Pinto.'
2. Government sire donkey, imported from Spain, 14 hands high. This donkey is introduced for the production of mules for which there is an excellent demand at remunerative prices.
3. Bulls of the following breeds:—Imported Hereford, pure-bred Zebu, cross-bred Red Poll, and Guernsey.
4. Imported Shropshire ram sheep.
5. Imported Berkshire boars.

Imported heifers for breeding can be purchased at ordinary market prices, also young thoroughbred Berkshire pigs. Eggs from imported Plymouth Rock fowls can be purchased at 2s. per dozen.

COTTON INDUSTRY.

Conference of Cotton Growers at Barbados.

A Conference of cotton growers under the auspices of the Agricultural Society was held at the Commercial Hall, Barbados, on Friday, April 14. Sir Daniel Morris, in addressing the meeting, said:—

Those who see the *Agricultural News* are pretty well informed with regard to matters connected with cotton growing and the position of West Indian cotton in the English market. It is a matter of very great interest to the people not only of Barbados but of the other parts of the West Indies to find that West Indian cotton has won its way by its own merits and good qualities into the foremost place in the English market. As you know, at the present time West Indian cotton stands at the top of all, superior even to the cotton produced in the Sea Islands whence we obtained the seed. Our cotton at the present moment is selling at from 2d. to 3d. per lb. over similar qualities of Sea Island cotton, and the latest information on that point is contained in a letter received from Mr. Wolstenholme who, under date March 28, wrote as follows:—

‘Carolina Island cotton is selling rather more freely, but very good crop lots are offering at 13d. to 14d. per lb. St. Vincent and Barbados are not only superior in fineness and length but are much brighter and more lustrous, and this I think accounts in a large measure for the higher prices we have obtained. In fine yarn lustre is a great qualification, and I have never seen brighter cotton than this season’s West Indian shipments.’

The cotton industry has now reached an important stage. It is recognized that it may be possible for the West Indies to supply practically all the fine long-staple cotton likely to be required in Lancashire. It would be rather singular if England should again have to turn for her best cotton to the West Indies, once her principal source of supply. Whether these colonies will rise to the occasion will depend on themselves. They are in a position in which they may realize the expectations of their friends or gradually let slip the advantageous position they now occupy. The West Indies, within a comparatively short time, have conclusively proved that they are as capable of producing the finest commercial cottons as they were more than 100 years ago. This is a convincing proof that they are not played out, but, when occasion arises, they can compete in their own particular line with any part of the world.

My object to-day is to place before the cotton planters in Barbados information whereby they might extend and improve the important industry already started, and utilize it for increasing the general prosperity of the people. Perhaps the most pressing matter with which we have to deal at present is the selection of suitable seed for planting during the coming season. We have been informed that we cannot hope to obtain any further seed from the Sea Islands of South Carolina. Fortunately, we have already existing in these islands a supply of Sea Island cotton seed, as good as, if not better than, the crop lots produced in the United States. What we have to do is to make a rigorous selection of the best seed and have it carefully disinfected so as to prevent the possibility of any disease being carried with it into the new fields. I would specially urge that no seed be introduced from one island to the other except through the Imperial Department of Agriculture, otherwise diseases are likely to be introduced which must add to the difficulties of the planters and possibly cripple the industry. If we are to grow

the best class of cotton, we must make it an annual crop and plant in new land which should be well tilled and well manured. This is the secret of large crops. About thirty years ago, the average yield of lint in the Sea Islands was only 103 lb. per acre. Since then, by better cultivation and judicious manuring, they have raised the average yield to 200 lb. of lint per acre. Now, while in this island we are able to produce cotton of the highest quality, the yield is not so satisfactory as could be wished. This year the drought has no doubt had something to do with it, but I understand on good authority that the cotton worm was allowed to devastate large areas in some districts of the island, and practically destroy the prospects of the crop. It has been suggested that one way of ascertaining whether the worm is present or not, is to pay a small reward to the weeders or others who first discover it. Another point is to realize that the worm generally makes its appearance in the middle of a field and not necessarily on the outskirts. The treatment of the worm by the use of Paris green is now so well understood, and it can be so easily controlled if taken in time, that no reasonable excuse can be offered by those who suffer severely from it.

An attempt has been made to ascertain what is the cost of producing 1 lb. of the best Sea Island cotton lint and placing it on the market. Several statements have been communicated to me varying according to the local circumstances, but I believe we may safely assume that under normal conditions, with selected and disinfected seed planted in good soil and well cultivated, the cost will not appreciably exceed 5d. per lb. In the case of an estate yielding, say, 700 lb. of seed-cotton (equal to 200 lb. of lint) and sold at 16½d. per lb., this would mean a profit at the rate of 11½d. per lb. of lint, or, say, \$46.00 (£9 11s. 8d.) per acre. If, on the other hand, the estate only produces 500 lb. of seed-cotton (equivalent to 140 lb. of lint selling at 16½d. per lb.), the net profit would be 11½d. per lb., or \$32.20 (£6 14s. 2d.) per acre. In the *Agricultural News* (April 8) there is given an interesting statement based on the results of growing cotton as a catch crop on 70 acres of cane land at St. Kitt’s, in which the estimated clearance per acre is \$28.22 (£5 17s. 7d.). The net profit in this instance would be 7d. per lb. The value of the lint was placed at 1s. per lb. only. It would be interesting to determine whether it is possible to grow cotton as a catch crop with canes in this island. I suggest this as a subject that might be usefully taken up and discussed at a future meeting of the Society. In returns recently prepared of the yield of seed-cotton on estates at Barbados it would appear that on thirty-three estates the yield was between 500 lb. and 900 lb. per acre, and on twenty-six estates it was below 500 lb. per acre. On nineteen estates the yield was 700 lb. and up to 900 lb. per acre, and on fourteen between 500 lb. and 700 lb. per acre. The best time for planting is a matter of great importance. The general opinion is now in favour of early planting, that is, during the months of June, July, and August, depending on the rains. Early planting has so many advocates that it deserves careful trial on a large scale during the coming season.

In reference to cotton matters generally, the planters in the West Indies may be regarded as having every advantage placed within their reach. The British Cotton-growing Association has done everything that it possibly could, in the erection of ginneries, sending out experts, and in finding a good market for the produce. The Imperial Department of Agriculture has obtained a supply of the best seed, and furnished information by means of its officers and its publications touching every detail; and I may

add, it will continue to take the deepest possible interest in the industry. All that is now required is careful organization on the part of the planters, and a determination to regard cotton growing not merely as a temporary expedient but as an industry calculated to be of the greatest possible benefit to this colony. On lands too light, or in localities where the rainfall is not suitable for growing sugar, cotton, as an annual crop, would yield returns, possibly exceeding those from sugar. I am not yet convinced that all the leading planters in this island have fully studied the subject of cotton growing, or are prepared to deal with it entirely on its merits. The high price now ruling for sugar may, to some degree, justify such action, but if we take the average price for, say, 1 ton of sugar and 100 gallons of molasses at Barbados during the last ten years at £10 2s. 4½d. and accept this as the probable price for the next ten years, I believe that under such circumstances, cotton, as an annual crop, occupying the land only for seven or eight months, would, in some districts, be found to pay better than sugar.

In any case, in view of the possibilities that are offered in connexion with the cotton and banana industries, the planters of Barbados cannot any longer complain that there is nothing to which they can turn their attention for a livelihood, except the cultivation of the sugar-cane. The cotton industry, equally with the cane industry, employs a large amount of labour, but no expensive buildings and machinery are required for preparing cotton for the market: while the waste product in the form of cotton seed may be utilized for the extraction of cotton seed oil, and for affording a valuable food for stock and, eventually, for fertilizing the land. In conclusion, I would mention that, as already announced, the Imperial Department of Agriculture is prepared, in order to safeguard the prospects of the cotton industry, to take charge of all the best seed produced in this island and to have it carefully hand-picked and disinfected, and supplied to the planters at cost price calculated at the rate of 5c. (2½d.) per lb. It is strongly urged that no cotton seed be planted this year until it has been carefully disinfected. It is also strongly recommended that there should be no general and indiscriminate interchange of untreated cotton seed between the several colonies as by such means there would be a wide-spread distribution of cotton diseases which would seriously injure the industry. The Department has no wish to interfere with private enterprise, but under the special circumstances which have arisen (owing to no fresh seed being available from the Sea Islands) it is important that the distribution of seed for planting purposes should be placed in the hands of a central authority having no pecuniary interests in the matter, and provided with a necessary staff and appliances for carrying on the work solely in the interests of those concerned.

Mr. H. E. Thorne said his experience as a cotton grower had taught him that the land must be thoroughly cultivated and properly manured. The present short crop was, no doubt, largely due to the drought, but probably also to want of cultivation. He urged most strongly on planters that they should go in for cotton cultivation on as large a scale as they possibly could, as the results were better than from cane cultivation. He had every hope that the industry would continue to grow and that its further development would be of permanent benefit to the colony.

Mr. H. A. Pilgrim, another large cotton grower, said he agreed with Sir Daniel Morris that cotton required the land to be cultivated as for cane. He had obtained excellent results from 12 acres on his own property in St. George's,

and he attributed these to good cultivation and the judicious application of farmyard manures, phosphates, and potash. Farmyard manure alone gave large bushes with a small return in lint. He recommended a moderate amount of farmyard manure with a judicious addition of phosphates and potash.

A cordial vote of thanks to Sir Daniel Morris, brought a very interesting Conference to a close.

TRADE IN ORANGE AND CITRON PEELS.

A report by Mr. J. R. Jackson, A.L.S., on the trade in England in orange and citron peels was published on p. 93 of this volume of the *Agricultural News*. In connexion therewith the following extract from a letter addressed to the Imperial Commissioner of Agriculture by Messrs. Sparks, White & Co., dated London, March 23, 1905, is likely to be of interest:—

We have examined the sample of bitter orange peel from Anguilla you sent us: it is very similar to peel which is shipped from the island of St. Kitt's, and what is known in the trade as 'Jacmel's' peels; although the sample you sent us is better than many of the shipments we have seen from that island. The consumption of this class of peel is a declining one, and it is worth about 1d. or 2d. per lb. here.

There is a class of peel, however, which is exported from the island of St. Kitt's, and which, we believe, is really the peel from a hybrid orange, and which is principally used by distillers or liqueur makers for the manufacture of the so-called Curaçoa liqueur, but the consumption is a declining one. If your planters could produce a peel from the thoroughly ripe, red, bitter fruit it would fetch a better price, not only in the condition of 'quarters' peel, that is, a quarter of the whole peel of the fruit, but also in the form of what is known as the machine-cut peel.

We import large quantities of bitter orange peel in the quarters condition from Spain, Sicily, and Italy, and have sent you under separate cover a sample of that particular peel, and we shall be pleased to receive counter samples to match it with direct offers. We have also sent you sample of machine-cut dried bitter peel of which we import large quantities, principally from North Africa, coming to us via Malta, and for this we shall be pleased to receive a counter sample to match, with offers. Then again we purchase what is known as hand-cut, dried ribbons from the bitter oranges, which is principally produced in the South of France and in Sicily, and, if you like, we would send you samples of that peel as well.

We are rather afraid, from the letters which we have received from Mr. J. R. Jackson, that you may think that these peels are used for producing what is known in the confectionary trade as candied peels, but they are not. Candied peels are made in one of two ways, viz., either from the fresh fruit or from the peel which has been boiled in brine and shipped to this country in that liquid, principally from Sicily, and it entirely depends upon price which is used.

What is known as citron peel in the candied condition is, we believe, a fruit of a hybrid and closely allied to the shaddock fruit, or what is known as *Citrus decumana*, which is shipped to this country in brine from, principally, the Adriatic, but as well as that there is the *Citrus medica*, which is also shipped to this country in brine from Calabria.

We think that your growers would get better prices for their peel if they took it from the ripe, red fruit and not from the immature: the demand for the immature peel, such as you sent us, is small and not an increasing one.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The important subject of ratooning cotton is fully dealt with in the editorial of the present issue. Cotton growers are strongly advised not to carry over their cotton plants from one season to another.

A further contribution by Dr. Watts on Muscovado sugar appears on pp. 114-5. The sampling of muscovado sugar is discussed. The table shows that there is considerable variation in the polariscopic test of the various samples which were taken from different parts of the same bag.

An account is given on p. 117 of a new disease of cacao, known as the 'thread' disease, which has appeared in the West Indies. It was first noticed in St. Lucia, but has since been found in Trinidad and British Guiana. It will probably best be controlled by means of pruning and the use of a lime-sulphur wash.

In connexion with the cotton industry we publish on p. 118 a brief report of an interesting Conference of Cotton Growers recently held at Barbados.

The first part of an article on the Preparation of Honey for the Market will be found on p. 125. This article, which appeared in the *Journal of the Board of Agriculture*, is likely to be of interest to bee keepers in these islands.

On p. 137 we publish a summary and review of interesting correspondence which has been appearing in the *West India Committee Circular* on the cause of the immunity enjoyed by Barbados from malaria.

Attractive Shade Plants.

A correspondent writes as follows:—An attractive climbing plant of slender habit suitable for growing as light shade for fowl runs, etc., was observed a short time ago at Government House, Grenada. The leaves are small and the flowers, produced in little panicles, are rosy or pale purple. It is probably a species of *Heteropteris*. Sir Robert Llewelyn has promised to supply some ripe seed later on. In the meantime it would be useful if readers of the *Agricultural News* would give their experience in regard to fast growing and attractive plants that are suitable to provide shade for verandahs, etc., without shutting out too much light and air.

Egyptian Cotton Seed for the West Indies.

During his visit to the West Indies, Mr. E. Lomas Oliver suggested that it would be desirable to carry out experiments, in certain localities, in the cultivation of the best varieties of Egyptian cotton. Mr. Oliver specified the following varieties as likely to give good results in the West Indies: Janovitch, Abbassi, and MitAffi.

With the view of assisting cotton planters to carry out experiments to test the suitability of Egyptian cotton for these islands, the Imperial Department of Agriculture has obtained, with the assistance of his Majesty's Consul-General in Egypt, 500 lb. of each of the above-mentioned varieties.

Those desirous of obtaining a supply of this seed should communicate with the Imperial Commissioner of Agriculture at an early date.

Sugar-cane Experiments in the Leeward Islands.

The second part of the large official report on the experiments with sugar-cane conducted at Antigua and St. Kitt's during the season 1903-4 is issued to-day. Part II deals with the manurial experiments.

The bulk of the report is considerably lessened this year owing to the change in the method of making the comparisons in these experiments. Instead of analysing the canes from each plot, comparisons are made upon the tonnage of canes, since it has been shown that manures 'exert their influence chiefly in altering the weight of the cane per acre without profoundly altering the weight of sucrose to the ton of cane.'

The results of the experiments appear to show that it is not necessary to use *artificial* manures for plant canes in the Leeward Islands, provided an adequate amount of good pen manure is used. With ratoon canes, however, the pen manure must be supplemented with nitrate of soda or sulphate of ammonia. The quantities of these manures found to give the best results are at the rate of 2½ cwt. to 3½ cwt. of nitrate of soda, or 2 cwt. to 3 cwt. of sulphate of ammonia per acre. The experiments bring out clearly the fact that better results are obtained when the nitrogen is given all in one dose than when it is divided into two doses.

Selected Tobacco Seed.

A supply of tobacco seed of the following kinds has been obtained by the Imperial Department of Agriculture from the United States, viz., 'Havana seed leaf,' 'First-crop Vuelta de Abajo,' and 'Connecticut seed leaf.' A supply of this seed can be obtained, on application to the Imperial Commissioner of Agriculture, free by post, at the rate of 32c. (1s. 4d.) per oz.

West Indian Onion Trade.

Samples of onions grown at the Experiment Station, Tortola, Virgin Islands, were submitted by the Imperial Commissioner of Agriculture to merchants in Barbados for a report and valuation.

It is reported that onions of the description submitted would be worth from \$2.00 to \$2.50 per 100 lb. The reports agreed that they were too large for the purposes of the small retail shopkeeper. It appears that in selling small quantities of onions smaller bulbs are more convenient, since they render division unnecessary. On this account onions of the size submitted would not find a ready sale. The consumer requires a small onion, say, of 1½ inches in diameter; also a strong flavoured onion, as they are used rather for seasoning food than as a vegetable.

Another point which is regarded by the merchants as of importance is that the onions should be shipped on strings, it being stated that when shipped in that manner, the value would be enhanced 1c. per lb., or perhaps more. 'This is explained by the well-known perishable nature of onions, which makes it absolutely necessary to keep them hung up and aired as much as possible whilst in store.'

Diseases of Cocoa-nuts.

Considerable attention has been paid in Jamaica to diseases of the cocoa-nut palm, many trees having been lost from one cause or another. Investigation by officers of the Department of Agriculture has shown that, while the immediate cause of death has been some insect or fungoid pest, the trees have been rendered liable to such attacks by unfavourable external conditions, such as when the trees have been planted in very poor or stiff clay soils, when the soil has been too dry or saturated with standing water.

It has also been proved, however, that there is a specific disease 'which attacks the flower parts and young nuts, sometimes spreading along the softer tissue, and at length reaching the terminal bud or the feeding roots.' Directions for treating this disease are given in the March issue of the *Bulletin of the Department of Agriculture, Jamaica*.

Experiments during the last two years have shown the 'most effectual remedy is to spray with Bordeaux mixture at intervals of six to nine months until there is no trace of the disease.' With a spray pump and a long hose, the nozzle of which is carried up the tree by a boy, there is no difficulty in spraying even high trees.

Conference of Cotton Growers at Barbados.

As stated elsewhere in this issue, a very successful Conference of cotton growers was held at Barbados on April 14. The address given by Sir Daniel Morris on this occasion will be found on p. 118. In the discussion which followed some interesting facts were put before the meeting by various cotton growers. There appeared to be a general feeling that the prospects of the industry were good, and that, where efforts had been made to keep the cotton worm in check, and the soil had been well cultivated, the results had been satisfactory. In many cases the yield of seed-cotton had not come up to expectation, but this was, for the most part, attributed to the drought.

Efforts are being made to obtain a careful estimate of the average cost of growing 1 lb. cotton and placing it on the English market. Information on this point will be published later when further figures are available.

It was suggested by Sir Daniel Morris that a special meeting of the Society should be held later to discuss the question whether cotton could be grown as a catch crop with cane in Barbados on the lines suggested for St. Kitt's in a letter to the editor of the *Agricultural News* published in the last issue. This is an important point which deserves careful consideration on the part of the planters.

Agriculture in Carriacou.

The annual report on the Carriacou district for the year ending December 31, 1904, is published in the *Grenada Official Gazette*. The Commissioner reports that the value of the foreign exports for the year was £10,635. 'In addition there is a considerable trade between Carriacou and Grenada in poultry and stock which is not included in the above return.'

Referring to the necessity for reafforestation, Mr. Whitfield Smith says 'steps are being taken to plant belts of shade trees on the pasture reserves and, by the free distribution of seeds and plants, to encourage allottees to protect their lands in a similar manner.'

During the year 5 acres of land at Beausejou estate have been laid out with economic plants as an experiment station. The plots include 2 acres in Sea Island cotton. Efforts are being made to demonstrate to the peasantry the advantage of cultural operations. Pure-bred fowls have been imported and distributed among the peasant cultivators to improve the local breeds of poultry. In a few remarks on the general agricultural possibilities of Carriacou, Mr. Whitfield Smith advocates the cultivation of limes as specially adapted to the circumstances of the island. Black blight, so prevalent in Grenada and St. Vincent, is practically unknown in the Grenadines, and its introduction should be avoided by the fumigation of all imported plants.

The oyster beds having of late shown unmistakable signs of exhaustion, it has been decided to close the industry for at least two years, as the only means of saving the beds from total extinction.



INSECT NOTES.

Report on Injurious Insects.

A report by Mr. W. E. Collinge, M.Sc., of the University of Birmingham, on the 'Injurious Insects and other Animals observed in the Midland Counties during 1904,' deals with a large number of pests and gives many remedies. It includes, besides insects, the mites, slugs, snails, and eelworms, all of which, together with many insect pests, have been forwarded by correspondents. Five species of eriophyid mites are dealt with. In the West Indies three new species have been described quite recently, viz., *Eriophyes gossypii*, Banks (the leaf-blister mite of cotton); *Eriophyes Morrisi*, Nalepa (the mite of the *Acacia*); and *Eriophyes bucidæ*, Nalepa (the mite of *Bucida burseras*).

The Coffee Leaf Miner.

A report in the *Experiment Station Record* on the seventeenth annual meeting of the Association of Economic Entomologists, held at Philadelphia on December 29 and 30 last, contains the following reference to the coffee leaf miner, *Leucoptera* (*Cemiotomum*) *coffeella*, a common pest in the West Indies:—

This is one of the most injurious coffee pests in the West Indies, causing great losses in Cuba and Porto Rico. On some coffee estates 56 per cent. of the leaves were affected. The life-history of the pest was described by M. T. Cook with special reference to methods of treatment. Spraying against the larvae in the leaf is of little avail. It is found possible, however, to control the insect quite thoroughly by repeated spraying against the pupa by means of kerosene emulsion, containing one part kerosene, one part whale oil soap, and eight parts of water. When numerous applications of this remedy were made, slight injury to the leaves occurred, but this injury was not of great importance. On the grounds of the Cuban Experiment Station spraying experiments were begun on August 18 and continued till November 5 at frequent intervals. The results of this experiment indicate that the treatment is quite effective.

Destruction of Locusts.

In the *Agricultural Journal of the Cape of Good Hope* for March 1905 there appears an interesting article on the destruction of locusts, by Mr. C. W. Mally, M.Sc., Acting Entomologist, of which the following is a brief summary:—

The best time to attack the locusts is when the young are about two-thirds grown, when their only mode of locomotion is hopping and when they have the habit of camping at night in compact masses, and travelling in swarms in the day time. These habits are taken advantage of in the work of destruction, as they are all favourable to the work, whereas it would be very difficult to do anything in the way of controlling the swarms after the insects had become adult and developed wings.

The essential points are embodied in the five conclusions as follows:—

(1) No one method will enable us to control the situation. An intelligent combination of the different methods systematically carried out is most likely to give satisfactory results.

(2) The newly hatched swarms should be destroyed by spraying (a) their food-supply with poisoned bait, or (b) the locusts themselves with Gossage's national blue-mottled soap, 1 lb. to 5 gallons of water.

(3) The land should be protected by means of a locust fence.

(4) The swarms of trekking locusts should be trapped and dried for poultry and stock food. They are thus not only prevented from coming to maturity and laying eggs for the next season, but are made to yield a substantial return for their damage to the veld and the time and money invested in destroying them.

(5) Natural enemies (especially birds) are already doing their best and should be protected whenever possible.

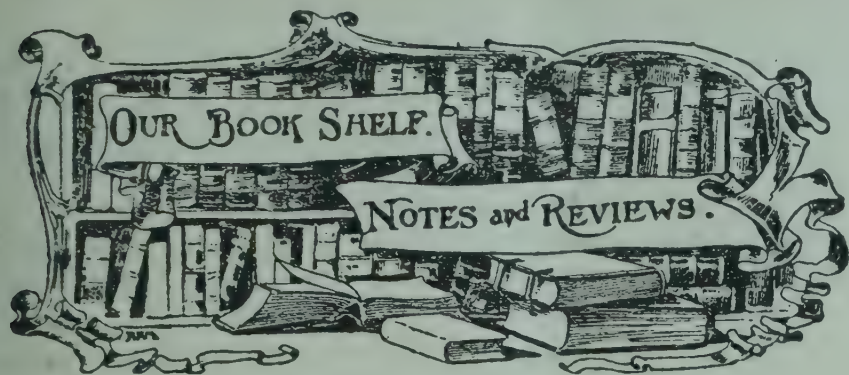
The spraying with poisoned bait is done when the young locusts are in compact swarms. All the grass and herbage in the vicinity are sprayed and as the locusts move along they feed on the sprayed vegetation. The mixture which has been found satisfactory is made as follows: arsenic, 1 lb.; washing soda, $\frac{1}{2}$ lb.; treacle or sugar, 5 lb.; water, 10 gallons. The arsenic and soda are boiled together till dissolved and then added to the 10 gallons of sweetened water.

A soap solution has been successfully used as a contact poison, sprayed on the young locusts, but most time and energy seem to have been devoted to the development of a suitable trap.

The locusts have a value as a stock food. Poultry and ostriches are especially fond of them, while they are eaten by horses, sheep, and pigs. It seems likely that a good market may be developed for dried locusts, if any considerable supply ever becomes available.

The method of trapping recommended is this: The trap consists of two fences of cloth, 18 inches high, extending at broad angles from an inclined plane or chute; this is placed in front of a moving swarm, and as the insects come into contact with the fences they are directed toward the chute, up which they travel and when they reach the top they fall into a sack; in these sacks they are killed by means of either carbon bisulphide or hot water. The dead locusts are then dried in the sun and kept for feeding purposes. The trap should be of strong, light material, so that it will be easily portable. Small areas of valuable lands may be protected from the young by fences of zinc or iron 18 inches high, similar to the wings of the trap.

The locust of South Africa is closely related to the common grasshopper of the West Indies, and although they differ somewhat in habits, some of the remedies found useful in Cape Colony may prove of value in case of an outbreak in the West Indies. Nearly every year grasshoppers become a nuisance, sometimes almost a pest, in St. Kitt's and Nevis. The poison spray found successful in South Africa might with advantage be applied to the lands where these grasshoppers breed. Trapping and spraying with contact poisons are not likely to be of advantage here, but the natural enemies should be encouraged and protected.



MANUAL OF FORESTRY: Vol. III. Forest Management. By W. Schlich, Ph.D., C.I.E., F.R.S., F.L.S. London: Bradbury, Agnew & Co., Ltd. 10, Bouverie St., 1905.

This is a revised edition in which many changes and alterations have been introduced. It is stated in the preface that the object of this 'Manual,' which was intended in the first place as a text-book for candidates for the Indian Forestry Department, was to give a clear picture of economic forestry.

This volume on forest management deals with (i) forest mensuration, (ii) forest valuation, (iii) the foundations of forest management, (iv) the preparation of forest working plans.

The appendices contain tables of useful information for foresters, and the fifty-eight plans and illustrations are of assistance in following the operations.

THE DESTRUCTION OF MOSQUITOS. By Major W. M. Hodder, R.E. Chatham: Royal Engineers' Institute, 1904.

The sub-title to this little publication states that it is 'an account of the drainage and other works carried out with this object [the destruction of mosquitos] during 1902 and 1903 at St. Lucia, West Indies.'

Major Hodder has not, however, confined himself to a bare statement of the works executed, but gives, also, his views and experience on this subject.

The first chapter deals with the outbreaks of fever at St. Lucia. Towards the end of 1901 yellow fever appeared on the Morne Fortuné: as a consequence troops were moved to Vigie, and here malaria fever broke out, necessitating a second move, this time to Pigeon Island, with satisfactory results. Observations during these outbreaks rendered it possible to plot out the infected areas at Vigie and to draw general deductions from the facts that became apparent later. The drainage of swamps, concreting beds of water courses, filling holes, etc., were put in hand.

In Chapter II, Major Hodder relates 'How yellow fever was stamped out in Havana,' stating, also, briefly the manner in which the various types of malarial fevers are carried from animal to animal by mosquitos. This is followed by a chapter on the habits of mosquitos.

After dealing in detail with the works at St. Lucia, the author discusses the precautions to be observed in building barracks, and in household arrangements. The great drop in the cases of malaria is evidence sufficiently good to show that some great change has taken place in the conditions which produce the disease.

This little book, which contains several plans and illustrations, might be read by all dwellers in tropical countries with much profit. The subject of the destruction of mosquitos is dealt with in a clear and practical manner, and a large amount of useful information on the habits of mosquitos and their relationship to tropical diseases is brought together.

RAINFALL RETURNS.

Grenada.

The following meteorological returns are extracted from the *Official Gazette*:—

	1904.	1903.
	Inches.	Inches.
<i>St. George's.</i>		
Richmond Hill ..	69.41	78.89
Annandale ...	160.18	150.20
Grand Etang ...	176.49	153.84
<i>St. David's.</i>		
Les Avocats ...	119.72	126.19
<i>St. Andrew's.</i>		
Dunfermline ...	81.70	82.13
Bellevue ...	94.55	90.13
<i>St. Patrick's.</i>		
Springbank ...	105.22	96.10
<i>St. Mark's.</i>		
Mt. Edgecumbe ...	108.34	86.35 *
<i>St. John's.</i>		
Dougaldston ...	110.05	107.12
Belvidere ...	167.65	168.20

The rainfall at the Meteorological Station in the south of the island was $9\frac{1}{2}$ inches less than in the preceding year and below the average for the previous twelve years. In the centre and north of the island, however, and in Carriacou the record of 1903 was exceeded.

CARRIACOU.

The following remarks on the meteorology of Carriacou are taken from the report of the Commissioner for the Carriacou district, for the year ended December 31, 1904.

The rainfall for the year was 56.67 inches, or 3 inches in excess of that recorded for 1903. These figures, when compared with the average annual rainfall of other colonies, for example, Barbados, 63 inches, Trinidad, 66 inches, Antigua, 50 inches, Virgin Islands, 57 inches, indicate that, after making all allowance for decreased humidity due to indiscriminate forest cutting in past years, Carriacou is not so far behind in the matter of rainfall as to account for the severe droughts to which the island is periodically subject. The question, therefore, resolves itself into one of conservation of soil moisture, and one naturally asks: Is it possible to do anything to save crops from such periodic droughts?

A very short experience of Carriacou during the rainy season will convince any observer that quite three-fourths of the rainfall passes off by surface drainage. This not only occasions great loss so far as immediate plant growth is concerned, but such washings also carry away with them much of the soluble plant food from the surface soil.

It is therefore of the greatest importance that the people should be brought to at least a rudimentary understanding of the conditions under which water exists in a soil and the part it plays in the operations of plant growth, and also be persuaded that the first step towards the conservation of soil moisture must be tillage, so that the rainfall, which is now lost, will sink down and not be carried off by surface drainage.

Until this is realized and carried into practice, little or no amelioration in regard to the occurrence of droughts can be expected.

* For ten months only.



GLEANINGS.

Shippers of bananas in Barbados are notified by Mr. J. R. Bovell that bananas will not be received later than 12 noon on the day of the departure of the mail.

Trinidad's exhibits for the Indian and Colonial Exhibition have been shipped to England in 123 cases (besides about thirty bundles of canes) by the last two mails.

Four crates of grape fruit have been shipped to Covent Garden market from the Dominica Botanic Station. Messrs. Pink & Sons say that they are the best grape fruit they have handled.

It is announced that a Stock Breeders' Association has been formed in Jamaica. Its objects are to encourage horse and stock raising in Jamaica, and to act as an exchange for buyers and sellers both at home and abroad.

Offers are invited for a 12½ Brake horse-power patent Hornsby-Akroyd horizontal fixed Oil Engine, No. 7,925, complete with fittings and spares, the property of the St. Vincent Government. Applications to be addressed to the Agricultural Superintendent, Kingstown.

The Government Entomologists of the Cape of Good Hope and Natal have been commissioned by their respective Governments to visit Brazil to investigate and, if possible, to obtain the parasitic and predaceous enemies of the fruit fly (*Ceratitis capitata*), which Compere reports in that country.

The Committee appointed by the Government of Barbados to make arrangements for a representative exhibit of the island's products at the Colonial and Indian Exhibition 1905, has issued a 'Handbook comprising historical, agricultural, and general information concerning the colony.' It also contains a catalogue of the exhibits.

A new, shallow-draught, twin-screw steamer 'Naparima' was launched on March 7 from the ship-building yards of Messrs. John I. Thornycroft & Co., Ltd. It is intended for the passenger and cargo service in connexion with the Trinidad Government Railway in the gulf of Paria, between San Fernando and Cedros.

Low-growing trees which do not shed their bark should be selected for supports for vanilla. According to a recent bulletin of the Experiment Station, the following trees are to be recommended for this purpose in Hawaii: The hog plum (*Spondias lutea*), coral tree (*Erythrina lithosperma*), calabash (*Crescentia Cujete*), and St. Thomas tree (*Bauhinia tomentosa*). The tree most commonly used as a support for vanilla elsewhere is the physic nut (*Jatropha Curcas*).

On Tuesday, the Annual General Meeting of the St. Lucia Agricultural Society was held in the Council Chamber, Castries, under the Presidency of Sir George Melville. A sum was voted for establishing a nursery of Chinese banana plants in view of encouraging an export trade in that fruit.

The last issue of the *Journal d'Agriculture Tropicale* contains a review of recent reports on Andropogons and their essential oils. Special reference is made to the writings of the late Mr. Charles J. Sawyer on citronella and lemon grass. An account is also given of the cultivation of these grasses in Java, where lemon grass is commonly grown on the banks between the rice fields.

Returns placed before the Board of Agriculture of British Guiana in connexion with rice cultivation in the colony, show that in 1904-5 the area under rice was 21,916 acres, the crop being 22,597 tons of paddy, and 16,600 tons of clean rice. This is an increase, compared with the previous year, of 5,247 acres, and an increase in yield amounting to 3,660 tons of clean rice.

Writing to the Imperial Commissioner of Agriculture in regard to the prospects of onion growing in the Virgin Islands, Mr. Fishlock says that better results are being obtained this year, the onions ripening more satisfactorily. 'Experience has shown that the best way to grow onions here is to plant the seed in drills in well-prepared seed beds, and then dibble the seedlings out into rows in well-prepared land during showery weather.'

The Proclamation issued by the Government of Trinidad on June 13, 1902, prohibiting the importation into the colony, from any part of the mainland of South America, of cacao plants, or of any portions of such plants, other than the cured beans thereof from Venezuela or Colombia, recently revoked, has now been re-issued. A further exception is made in the case of fresh beans from places in the two above countries proved to be free from all disease, any such beans to be thoroughly disinfected before distribution in Trinidad.

At a meeting of the British Guiana Board of Agriculture held on March 31, Mr. Bartlett spoke at some length on the diseases to which the cacao plant is liable. He had recently paid a visit to the cacao estate up the Demerara river, and he illustrated his remarks with specimens of diseased foliage and pods which he had obtained. On one estate he found a plant with what is known as the 'witch broom' disease, which had caused so much damage to the cacao estates in Surinam. (*Demerara Daily Chronicle*.)

The following is extracted from a review in the *West India Committee Circular* on the last half-yearly report of the Colonial Bank: 'The weather generally throughout the West Indies has been too dry for the sugar crop, which will be short, but the prices now being obtained for both sugar and rum should leave planters a fair margin for profit. According to Sir Daniel Morris, "considerable progress has been made with cotton growing, and he estimates that the crop of Sea Island cotton to be reaped by the end of May will reach some 5,000 bales (of 360 lb. each), of the value of about £100,000."* The banana crop in Jamaica promises well, but that colony is still suffering from the effects of the hurricane of 1903.'

* Owing to severe drought and other causes, the cotton crop will be less than anticipated, and may not reach 3,000 bales.



BEE KEEPING.

The Preparation of Honey for the Market.

Mr. T. J. Weston writes in the *Journal of the Board of Agriculture* (Great Britain) on this subject. In view of its importance to bee keepers in the West Indies, this article is reproduced for the benefit of readers of the *Agricultural News*:—

The bee and honey classes of the shows now held during each season, both in London and the country, have taught the consumer what to require in a first-class honey. Comb-honey (in section cases) should be translucent, showing the clarity and light colour of the contained honey, evenly and delicately worked out to the sides and bottom of the section, and with a scrupulously clean surface. The finest liquid extracted-honey should be bright and clear, of a light straw colour, and delicate in flavour and aroma. Granulated extracted-honey should be of fine, even grain, creamy white in colour, and of good flavour. There are many grades of medium and dark-coloured honeys below this first-class standard, but the latter is what the bee keeper must strive to attain, in order to command a ready sale for his produce.

In regard to comb-honey, the preparation commences with the fitting of the wax foundation in the section boxes. To ensure a well-worked-out section this should be cut so as just to clear the sides of the box and hang to within $\frac{1}{16}$ inch of the bottom, thus allowing for a slight stretching of the foundation caused by the heat of the bees clustering on its surface. The fitted boxes must next be placed in the section rack, with separators between the rows, reaching to within $\frac{3}{8}$ inch of the top and bottom, and wedged up perfectly square and tight; this is important, for the bees will place propolis over every crack or small space, causing disfigurement and extra work in cleaning; also sections 'out of square' are much more liable to breakage when packed for travelling, owing to the unavoidable spaces between them. The rack must be placed perfectly level on a hive containing a strong colony of bees, it will then be filled with good, straight, and even combs. Removing filled racks from the hives should be done with as little disturbance to the bees as possible: the best method is to place a 'super-clearer' on a stool or box by the side of the hive, raise up the bottom edge of the rack and insert a small wedge; puff a little smoke between the rack and tops of the frames, then remove the rack steadily with a screwing motion, and put it down gently on the 'super-clearer'; place a cloth, on which a few drops of carbolic acid have been sprinkled, over the top of the frames, and in about ten seconds remove it, the bees will have been driven down, leaving the tops clear; then immediately take up the rack with the 'super-clearer' and place them on the frames. If this operation is carried out in the afternoon, by next morning every bee will have found its way down to the body of the hive through the bee-escape in the centre of the 'super-clearer,' and the rack can be removed with comfort to the bee keeper and without disturbance to the apiary. When sections are taken out of the racks while the latter are

still on the hives or full of bees, the disturbed bees will frequently pierce the cappings in many places to gorge themselves with honey, and wherever this happens 'weeping' will be caused when the sections are kept for any length of time in store.

The full racks should be carried into a bee-proof room, the wedges and back-board removed, and the centre section of the exposed row taken out. Do not attempt to lift it straight out, the results would probably be a damaged section, but tilt it backward on its bottom edge, and when loosened it will come away easily, as also will the two side ones. Sort the sections as they are taken out, putting all well-filled clear ones as the first grade; those not well worked to bottom and sides, and therefore not fit for travelling, make a second grade, and any only partially filled must be given back to the bees to finish, unless the 'honey-flow' has ceased, and in that event they must be emptied by the extractor. Carefully scrape all propolis from the edges of the sections, and, if not already sold, store them in a dry, warm cupboard, protecting them from dust by tying in packages of four or six in clean paper; be very careful not to place anything having a strong odour near the honey-comb, or it will spoil the flavour.

If the sections are sold to wholesale dealers for re-sale to traders, no further preparation is needed. To pack them so as to travel safely, not more than from four to six dozen should be put into one package, preferably the smaller quantity. Procure a strong wooden box, bore two holes in each end, about one-third down, and knot firmly into them rope handles, by which the box can be safely and easily lifted; put into the bottom of the box a bed of coarse hay, and on this place, quite close together, a layer of the wrapped-up packages of sections, leaving at least 2 inches between the sides of the box and the sections: this space must be filled with hay, tightly pressed in, and, to prevent possible damage to the comb, the ends of the packages may be protected by pieces of straw-board or thin wood; continue with layers of packages, filling in round the sides as before, until within 2 inches of top, then fill up tightly with hay, and screw on the lid. Label the package plainly: 'Comb-honey, with care.' Retailers of honey-comb prefer to have the sections sent them glazed, it preserves the comb from injury by careless handling, and, what is still more important, it is kept free from the dusty impurities unavoidably present in shops.

(To be concluded.)

WEST INDIAN AGRICULTURAL CONFERENCE, 1905.

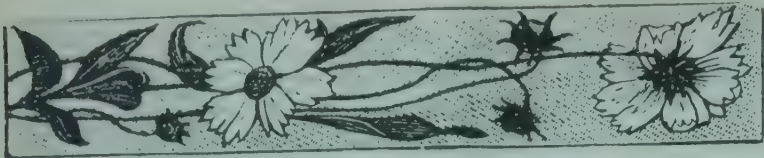
The following despatch from the Secretary of State for the Colonies to his Excellency the Governor of Trinidad, dated Downing Street, February 25, 1905, is published for general information:—

Sir,—The Imperial Commissioner of Agriculture for the West Indies has sent me a report of a very successful Agricultural Conference recently held at Port-of-Spain, and has brought to my notice the share which the efforts of you and your officers and the unofficial community of the colony had in promoting its success.

I have much pleasure in expressing my appreciation of the cordial reception extended to the delegates, and the active participation of the Government and people of the colony in the proceedings.

I have, etc.,

(Sgd.) ALFRED LYTTTELTON.



EDUCATIONAL.

Barbados.

The following is an extract from the Annual Report of the Inspector of Schools in Barbados for the year 1904:—

The *Tropical Readers* and *Nature Teaching* are now read in almost every boys' school and also in a few girls' schools. Questions on the text are set to the upper classes on the day of examination and the teachers are required to give object-lessons in the presence of the examiner. The number of passes gained in this subject by standards from III to VII amounted, in 51 boys' and 3 girls' schools, to 820. In some of the schools, attention is given to the cultivation of plants in pots, boxes, tubs, etc. The show of cabbages, parsley, English peas, etc., in the school childrens' section of the exhibition at Dunscombe in January of this year was evidence of the progress that has been made in this respect. In a very few instances it has been possible to establish a small school garden, and from these, also, the vegetables were a testimony that the training of the hand in practical work is not neglected in our system. Good Intent, St. Matthew's, Holy Innocents', Southborough, and Mount Tabor schools were the principal prize-winners this year.

It is not easy to obtain land around the schools for gardens, nor are funds available for the purchase of agricultural tools, etc. The limited legislative grant is hardly sufficient to supply the necessary reading books, slates, and other apparatus which are the first requisites in an elementary school. Again, many of our teachers are not resident at their schools, and to cultivate plants in a school garden, where no responsible person is on the spot, would in such cases offer further temptation to idlers who are already too much given to praedial larceny.

Agricultural Instructors in Trinidad.

The annual report on the Trinidad Botanical Department for the year ended March 31, 1904, contained the following remarks on agricultural instruction which are reproduced from the current issue of the *Bulletin of Miscellaneous Information*:—

The share taken by this Department in agricultural education consists in supplying two trained men, under the title of Agricultural Instructors, who are detailed to visit every district in the island for the purpose of (1st.) affording theoretical and practical agricultural instruction in schools, (2nd.) holding public meetings for the discussion of agricultural topics, (3rd.) visiting the lands of the people to afford practical instruction in tillage, pruning, and other operations, and (4th.) holding lectures in public places at which agricultural operations can be discussed and advice afforded to all inquirers. This work has been very popular, and the demand for the services of the Instructors has been such that it has been found impossible to meet all requisitions with the number of officers already appointed, and the limited provision allowed as a start. For the coming year increased provision for travelling has been made, so as to allow the Instructors to make more frequent visits to each district. As the effort is quite new to the Department, it was

found impossible to arrange the work of the Instructors in any regular or systematic manner, but it is hoped that in the coming year it will be possible to provide for more frequent visits to each district. A demand has been made in more than one place for resident Instructors. With the present staff, this has been found impossible and could only be carried out by the appointment of more officers.

One hundred and three schools were examined, and hints on proper formation and management of school gardens were given.

Three courses of lectures in agriculture were given at the Government Training School in Port-of-Spain, and one course at the Naparima Training School, San Fernando. The second course at the former school was attended by eight students from the Roman Catholic Training School in Port-of-Spain.

School Gardens in St. Lucia.

We extract the following from the *Voice of St. Lucia*:—

Mr. G. T. Cumberbatch, who has been examining the primary schools, having consented to adjudge the prizes offered by the Agricultural Society for the best school garden, recommended that the £5 voted with this object by the Society should be divided in the following proportions:—

To the Castries Anglican Juvenile School	£2	10s.
To the Saltibus R.C. Mixed Combined	1	10s.
To the Vieuxfort R.C. Boys	1	

But, he added, if the Society saw its way to increasing its vote, three prizes of greater value should be awarded to the three schools in the proportion suggested.

The Society awarded prizes of £5, £4, and £3 respectively, to the three schools, conformably with the suggestion of Mr. Cumberbatch, whose willing service in this connexion is very highly appreciated.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture will probably proceed on May 22 next to Tobago, to meet his Excellency Sir Henry M. Jackson, K.C.M.G., who will then be on a visit to that island.

The Secretary of State for the Colonies has appointed Mr. William Robson, formerly of the Royal Gardens, Kew, to be Curator of the Experiment Stations at Montserrat from April 11 last. Mr. Robson holds certificates for Theoretical and Practical Chemistry (Board of Education) and for Land Surveying (County Council Examination).

Abnormal Growth of *Corypha elata*. Reference was made in the *Agricultural News* (Vol. II, p. 77) to the unusual behaviour of a plant of *Corypha elata* growing in the Botanic Gardens in British Guiana. In a recent issue of the *Argosy*, Mr. Waby writes that this tree was cut down on April 3, and an opportunity was thus given for making further observations as to this abnormality. Instead of producing a flowering panicle, this tree started into fresh growth at the beginning of 1903, producing at the top, as it were, a young plant about the size of one six or seven years old, with no sign whatever of the panicle. In the following July flowers appeared. It was found that the fruit of this plant weighed 1,100 lb. and contained over 51,000 seeds.

IMMUNITY OF BARBADOS FROM MALARIA.

An interesting and profitable discussion has been taking place in the columns of the *West India Committee Circular* on the subject of the distribution of mosquitos, more particularly in relation to the absence of *Anopheles* in Barbados. A reference to this fact in a review of Major Hodder's *Destruction of Mosquitos*, prompted Mr. Gibbons to put forward the suggestion mentioned below. The following is a review of the correspondence by the Editor of the *Circular*:—

The correspondence which is proceeding in our columns regarding the destruction of the *Anopheles* mosquito, which is admittedly the communicating agent of malaria, and the complete immunity from this pest, which Barbados alone of all the West India Islands appears to enjoy, is of more than usual interest to those connected with the West Indies. Major W. M. Hodder, who was recently engaged in drainage and other works in St. Lucia with the object of stamping out malaria, laid stress on the fact that if the reason why Barbados, although it has swamps and the mosquitos might easily be imported, has no *Anopheles* and consequently no malaria could be discovered, a much more simple means of destroying the insect would be at hand than by the costly method of drainage and clearing at present employed.

Mr. C. Kenrick Gibbons, who has resided for many years in Barbados, then propounded the interesting theory that this might be due to the presence in the swamps and ponds of Barbados of a tiny fish which exists in such teeming numbers as to earn the name of 'millions,' whose staple diet is the larvae of mosquitos.

Major Hodder, in an instructive letter, tabulated the supposed reasons for the immunity of Barbados, namely, physical and meteorological conditions unfavourable to the *Anopheles*; a microbe enemy or poison to which these mosquitos fall victims; the existence of the voracious 'millions;' or the possibility that the *Anopheles* had never been imported. Of these four suggested reasons only the second and third could be put to a practical test, and already Major Hodder had proposed to take water from two or three swamps in Barbados and watch its effects in St. Lucia when he was recalled from foreign service.

No less an authority than Sir Patrick Manson has now contributed his views to the discussion, and in a letter which we give in another column he reminds us that a case of local immunity from malaria analogous to that of Barbados is found in the Pacific Islands, where elephantiasis and filarial diseases are very prevalent, while malaria in many of the islands is unknown. With regard to the Pacific Islands it is possible, of course, that the *Anopheles* has never been imported, but this is inconceivable in the case of Barbados, and Sir Patrick Manson admits the possibility of the correctness of Mr. Gibbons' suggestion, though he naturally declines to accept it without further proof. He points out that there is another and an even more important point bearing on the relation of the *Anopheles* to malaria which demands study, and might carry with it useful and practical suggestions. This is, that in certain malarial regions, notably in India, Italy, and Mauritius, there exist circumscribed areas in which, although the *Anopheles* abound, malaria is absent, and we agree in thinking that every conceivable effort should be made to ascertain the reasons for this apparent anomaly. Many explanations have been put forward, but they are of little value unless substantiated on the spot.

There is one weak point in Mr. Gibbons' theory that appears to have escaped notice. There are two species of mosquitos quite common in Barbados, namely, *Culex fatigans* and *Stegomyia fasciata*.

The question arises, then, as to why these have not been exterminated with the *Anopheles*. It is not that the small fish mentioned by Mr. Gibbons do not eat the larvae of one or both of these species, as he himself says that he has seen them doing so. The evidence for the theory as to the extermination of *Anopheles* is that Mr. Gibbons has seen these fish eat the larvae of either *Culex* or *Stegomyia* (or both), neither of which is at all approaching extermination; also there seems nothing in the habits of these mosquitos or their larvae which would render them less liable to attack.

From a later issue of the *West India Committee Circular* we learn that steps are being taken to put Mr. Gibbons' theory to a practical test. Quantities of the fish have been taken to Colon and British Guiana for the purpose.

SCIENCE NOTE.

The Trumpet Tree.

This tree which is quite common throughout the West Indies is known to botanists as *Cecropia peltata*. It belongs to the natural order *Urticaceae* which contains also the bread-fruit, jack-fruit, the Assam rubber tree (*Ficus elastica*), and other useful plants. The genus *Cecropia* embraces a number of species indigenous to Tropical America and the West Indies. It receives its common name from the fact that pieces of its hollow stem or branches have been used for making musical instruments. While the trumpet tree does not yield timber as do many other trees of this order, it is of use as a shade tree. Its straight, bare trunk, with large and spreading head, renders it particularly suitable for this purpose. In Jamaica it is very common throughout the island wherever the virgin forest has been cleared for cultivation. As a shade tree it is employed more particularly in the coffee plantations in the central districts.

The tree has a somewhat striking appearance, growing to a height of upwards of 50 feet. Its trunk is whitish, about 1 foot in diameter. The leaves are large and deeply lobed being covered on the under side with a snow-white down.

The extremely light wood of this tree is used for making floats for fishing nets, and also razor strops.

An interesting feature of the trumpet tree is the curious relationship with ants which, in some countries, inhabit the hollow stems. This is described by Willis in his *Flowering Plants and Ferns* as follows:—

'The hollows are inhabited by fierce ants (*Azteca* sp.), which rush out if the tree be shaken and attack the intruder. Schimper has made a thorough investigation of this symbiosis (or living together for mutual benefit) of plant and animal. These ants protect the *Cecropia* from the formidable leaf-cutter ants.'

A drug is obtained from the trumpet tree. A related species, *Cecropia obtusa*, has recently been subjected to minute histological and chemical examination by E. Perrot and E. Choay, whose results are summarized in the *Pharmaceutical Journal*. Chemical examination of the leaves revealed the presence of small quantities of an alkaloid known as cecopine.

MARKET REPORTS.

London,—March 28, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 24, 1905; and 'THE PUBLIC LEDGER,' March 25, 1905.

ALOES—Barbados, 15/- to 40/-; Curaçoa, 15/- to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. to 1¾d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/7 to 1/8 per lb.
BEES'-WAX—£7 10s. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 55/- to 60/- per cwt.; Grenada, 52/- to 54/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.
COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—4/6 per bunch.
GRAPE FRUIT—14/- to 16/- per box.
ORANGES—10/- to 13/- per case.
PINE-APPLES—St. Michael's, boxes of 8, 2/2 to 3/; boxes of 10, 1/4 to 2/- per pine.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, bright small, 30/6 to 31/6 per cwt.

HONEY—16/6 to 22/6 per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 1/- to 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/4 to 1/5 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Pale West Indian, 1/7; broken 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.

NUTMEGS—74's, 1s.; 101's, 7½d. per lb.

PIMENTO—2¼d. to 2¾d. per lb.

RUM—Demerara, 1s. 2½d. to 1s. 4½d. per proof gallon; Jamaica, 2s. per proof gallon.

SUGAR—Yellow crystals, 20/6 to 22/- per cwt.; Muscovado, 18/- to 19/- per cwt.; Molasses, 14/6 to 18/6 per cwt.

SULPHATE OF AMMONIA—£13 17s. 6d. per ton.

Montreal,—February 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 9c. to 9½c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 28c. to 30c.; Antigua, 23c. to 25c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5½c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.65 to \$3.75 per 100 lb.

—Muscovados, 89°, \$2.90 to \$3.00 per 100 lb.

—Molasses, 89°, \$2.65 to \$3.75 per 100 lb.

—Barbados, 89°. No quotations.

New York,—March 31, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11¾c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.

COCOA-NUTS—No quotations.

COFFEE—Jamaicas, 8½c. to 8½c. per lb. (ex store).

GINGER—Jamaica, 5½c. to 5½c. per lb.

GOAT SKINS—Jamaicas, 59c. to 60c. per lb.

GRAPE FRUIT—Jamaicas, \$3.00 to \$4.50 per barrel.

ORANGES—Jamaica, \$4.00 to \$4.50 per barrel (stem cut).

PIMENTO—4½c. per lb.

SUGAR—Centrifugals, 96°, 5c.; Muscovados, 89°, 4¾c.; Molasses, 89°, 4½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 5, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—24c. per gallon, package included.

SUGAR—\$2.75 per 100 lb. 89°

Barbados,—April 8, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.75 per 100 lb.

CACAO—Dominica, \$11.00 per 100 lb.

COCOA-NUTS—No quotations.

COFFEE—\$11.00 to \$12.00 per 100 lb.

HAY—96c. to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00.

MOLASSES—24c. per gallon.

ONIONS—Teneriffe, \$3.00 to \$3.15 per 100 lb.

POTATOS, ENGLISH—\$1.68 to \$1.93 per 160 lb. (retail).

RICE—Ballam, \$4.40 to \$4.75 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR.—Muscovados, 89°, \$2.60; Dark crystals, 96°, \$3.10 per 100 lb.

British Guiana,—April 6, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$6.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14½c. to 15c. per lb. (retail).

—Creole, 12c. to 14c. per lb.

DHAL—\$4.00 to \$4.25 per bag of 168 lb.

EDDOES—\$1.08 to \$1.56 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Madeira, 3½c. to 4c.; Lisbon, 4½c.; Garlic, 5½c. per lb.

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—24c. to 60c. per bunch.

POTATOS, ENGLISH—Picked, \$2.50 to \$2.75 per barrel.

RICE—Ballam, \$4.30 to \$4.35 per 177 lb.; Creole, \$4.00 per bag.

SWEET POTATOS—Barbados, \$1.20 per bag; \$1.20 per barrel.

TANNIAS—\$2.40 per barrel.

YAMS—White, \$1.92 per bag.

SUGAR—Dark crystals, \$3.30½ to \$3.35; Yellow, \$4.00 to \$4.10; White, \$4.90 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—April 6, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$12.00 to \$12.25; estates, \$12.50; superior plantation, \$12.75 to \$13.25 per fanega (110 lb.); Venezuelan \$12.35 to \$12.60 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9½c. per lb.

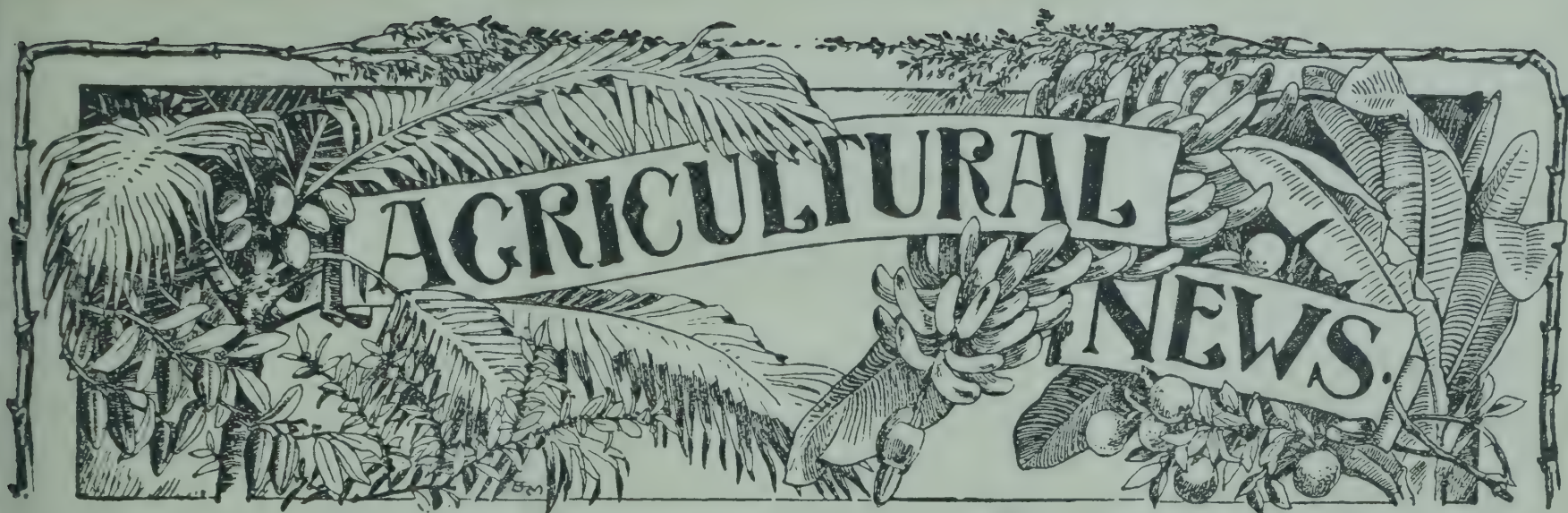
COPRA—\$2.90 to \$3.00 per 100 lb.

ONIONS—Teneriffe, \$2.00 to \$2.25 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.12 to \$1.25 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; white \$4.75 to \$5.75 per bag.

SUGAR—White crystals, \$4.50; yellow crystals, \$3.50 to \$3.75; molasses sugars, \$2.75 to \$3.75 per 100 lb.



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at the Colonial and Indian Exhibition to be held at the Crystal Palace this year.

The exhibition, which will be officially opened by the Lord Mayor of London and the Sheriffs on May 12 next, is certain to be visited by a large number of persons interested in these colonies. It is, therefore, of great importance that the West Indies should be adequately represented. The West India Committee has, from the beginning, taken a very active part in connexion with the representation of these islands, and it is largely due to its energetic action that the preparations have been brought to so satisfactory a position. The action of the West India Committee has received hearty support in these islands where local committees have been busy in getting together representative exhibits for the West Indian court.

Reference to the plan of the Exhibition, which was published in the *Agricultural News*, Vol. IV, p. 39, will show that a most advantageous position has been allotted for the West Indian Court, immediately in front of the central entrance to the Palace and adjacent to the central transept.

The Court will occupy a space of about 7,000 square feet, of which each colony, and the Royal Mail Steam Packet Co., will have its integral section. Every effort has been made to render the Court attractive, which will have, according to the *West India Committee Circular*, 'an open screen, running all round, of a rich, buff colour, the mouldings relieved with lacquered gold, and the facias ornamented with a blue ground, and also relieved with gold; and an inner screen, which

Colonial and Indian Exhibition,
1905.

REFERENCES have been made from time to time in the *Agricultural News* to the preparations that have been made in the various West Indian Colonies to secure representation

it is hoped to construct of sugar-canes, which the colonies have been asked to contribute.' It may also be mentioned that the Department of Public Gardens and Plantations in Jamaica is supplying, for decorative purposes, sixty tubs of growing plants in addition to canes and bamboos.

It is generally recognized that the value of these exhibitions lies in the promotion of trade, and it is mainly with the view of promoting trade between the West Indies and the Mother Country that exhibits are being sent from the various colonies. Thus, the large exhibit from Trinidad includes samples of the principal industries of the colony, viz., cacao, sugar, and asphalt. In addition, there are exhibits of the minor industries, such as honey and wax, walking sticks, tobacco, local-made soaps, bay oil and bay rum, as well as samples of the colony's mineral products (manjak, oils, etc.).

With a view, also, of making West Indian products better known in the United Kingdom, a quantity of literature dealing with the colonies has been supplied for distribution. The Committee appointed by the Government of Barbados has issued a handbook (with an ornamental cover designed by Lady Carter) comprising historical, agricultural, and general information concerning the colony. It also contains a complete catalogue of the exhibits from Barbados.

From several colonies representatives have been sent to take charge of the exhibits. Mr. J. H. Hart, F.L.S., the Superintendent of the Royal Botanic Gardens, is in charge of the Trinidad exhibits; Mr. John Barclay, the Secretary of the Jamaica Agricultural Society, and Mr. Frank Cundall, Secretary of the Jamaica Institute, are acting in a similar capacity for Jamaica, while the Hon. Forster M. Alleyne will represent Barbados.

The hearty manner in which this matter has been taken up in the various islands is an indication of the desire to promote the agricultural resources of the West Indies, and the efforts made should have the sympathetic approval of all who have the interests of these islands at heart. It is a matter of general regret that British Guiana is the only important colony not adequately represented at this Exhibition.

The West Indies are to be congratulated upon the interest that has been taken in their welfare by the West India Committee, to whom the thanks of these colonies are due for the time and energy that have been spent in promoting the objects of the Exhibition.

In this connexion it is desirable to refer again to the suggestion of the Secretary of the West India Committee, that in all the West India Islands and in British Guiana permanent exhibition committees should be appointed with the view of securing adequate representation at all exhibitions in Great Britain. There is also the further suggestion that it might be possible to arrange for a special court at the Crystal Palace where a permanent exhibit could be placed. This would be useful, also, in connexion with provincial exhibitions for which supplies could be drawn from the permanent exhibit. This is a matter which might usefully be taken up and discussed by the Chamber of Commerce, the Agricultural Boards, and the Agricultural Societies in these colonies. There can be no doubt that it is greatly to the advantage of the West Indies that their products should be brought to the notice of commercial men abroad and that their resources should become better known. This can, to a great measure, be secured by having selected exhibits at all the principal exhibitions not only in the United Kingdom but in the Dominion of Canada and elsewhere.



SUGAR INDUSTRY.

Limitations of the Naudet Process.

The following is extracted from a report in the *Demerara Daily Chronicle* of an interview with the Hon. R. G. Duncan who recently visited Trinidad:—

Speaking of the Naudet process, which he saw at work at Caroni, Mr. Duncan was by no means enthusiastic as to the superiority claimed for it over every other existing method of sugar making. The plant at Caroni Usine is understood to be the largest of the kind yet erected, and Mr. Duncan admits that the process on full development may prove highly successful. But the idea does not yet appear to have been perfected. Asked whether the new plant was capable of giving a 99 per cent. extraction from the cane, Mr. Duncan replied that the statement was not true. It gave no better results in this respect, he said, than triple crushing in Demerara. Another difficulty he referred to was the successful and satisfactory carrying out of the diffusion process. For this purpose a large quantity of water is required to pass through the megass, and the difficulty consists in so preparing the megass that the water will come into contact with all its cells. In the plant at Caroni, this idea has not yet been developed to perfection.

Mr. Duncan also contends that the diffusion process to which the megass is subjected lessens the value of the latter for fuelling purposes. At Caroni, the megass does not suffice for the furnaces, and some additional fuel is necessary. In the case of the average Demerara sugar factory Mr. Duncan considers that the need for a complementary

fuel supply would be even greater, because of the lower saccharine richness of the canes in this colony compared with those of Trinidad. On the whole, Mr. Duncan believes that the Naudet process admits of very material development, and that it may yet attain much popularity in these colonies.

Sugar-cane Experiments in British Guiana.

The following are extracts from a progress report for the half-year ended December 31, 1904, on the sugar-cane experiments that have been carried on in the experimental fields attached to the Botanic Gardens, British Guiana, under the control of Professor J. B. Harrison, C.M.G., M.A., assisted by the advice of the members of the Sugar-cane Experiments Committee of the Board of Agriculture:—

The months of July, August, September, and October were occupied by the agricultural operations proper to the season. The canes made fair growth during this period. During October and November examinations were made of some thousands of new seedlings raised from seed in 1901 and 1902. The canes commenced to arrow late in July, Brekeret and Kara-Kara-Wa flowering freely towards the end of that month. These were followed by Nos. 322, 358, 359, 377, 382, 393, 54, 4,408, 95, 3,287, 74, and 130, and by Kamba-Kamba, Vati, and Armstrong in August, while the majority of varieties were flowering by the middle of September.

Owing, probably, to the exceptional dryness of the weather, a large proportion of the arrows were abortive and remained arrested in their sheaths. Due, probably, to the same cause, was the very great scarcity of fertile seeds produced this year. Two hundred and twenty-three sowings were made and only 292 seeds of five varieties germinated, the lowest rate for many years. About 170 young seedlings have been secured. The most prolific variety was No. 115, followed by No. 1,087, and by No. 130.

The average yield of the second ratoon canes in the North field was at the rate of 23 tons of canes per acre, that of the first ratoons 22.2 tons. The average yield of the varieties reaped from South field as first ratoons, twelve months old, was at the rate of 17.7 tons of canes per acre.

The experiments with nitrogenous manures have produced singularly clear proofs of the dependence of the yield of the sugar-cane on the proportion of available nitrogen added in the manures, and, with others previously reported, show that the various varieties of sugar-cane resemble the Bourbon in the dependence of their yield upon this constituent.

Taken in connexion with the figures yielded by the analyses of the soil made in 1891-2 and in 1902, and contained in the reports for 1896-1902, and for 1902-3, these results confirm the opinion expressed in January 1904 that, if a British Guiana sugar-cane soil shows on analysis a content of .008 per cent. of phosphoric acid soluble in 1 per cent. citric acid solution, or of .002 per cent. soluble in two-hundredth normal hydrochloric acid, under conditions of constant shaking for five hours, manuring with phosphates in all probability will not produce commensurately increased yields of sugar-cane.

The above conclusion, based on the results of thirteen years' field experiments, is an important one for the guidance of planters in this colony. At present large quantities of slag-phosphates are yearly imported at an approximate cost on the field of, say, \$20 per ton, and are applied to the soil at the rate of several hundredweights per acre. By

submitting a properly drawn sample of the soil, to which he contemplates applying slag-phosphates, for analysis (at a cost of \$2.50), the planter can ascertain whether his soil contains more or less than .008 per cent. of phosphoric acid soluble in 1 per cent. citric acid, and thus be guided as to the advisability of applying phosphates. In my opinion considerable economy would ensue from the adoption of this course.

The high yield of B. 147 in these experiments is worthy of note. As it did in the earlier Barbados experiments under similar conditions of plot-growth, it has appeared to be a cane of exceptionally high potential value, while, as it is reported to have been in Barbados, in this colony on the large scale it has been a comparative failure.*

Two hundred and thirty mule-cart loads of canes were distributed during the last fortnight of December to the various plantations which applied for them. I am of opinion that we now know sufficient about our new varieties of canes to be able to recommend some of them, such as D. 109, D. 145, and D. 625, with confidence to cane farmers and I hope in the near future to receive applications from them.

WEST INDIAN AGRICULTURAL CONFERENCE, 1906.

The following is an extract from a letter from the Acting Colonial Secretary, Jamaica, to the Imperial Commissioner of Agriculture for the West Indies, dated March 24, 1905, in which reference is made to the proposal to hold the next West Indian Agricultural Conference in Jamaica:—

I am desired by the Governor to inform you that both the Board of Agriculture and the Agricultural Society consider that it would be highly desirable in the interests of this colony that the next West Indian Agricultural Conference should be held in Jamaica.

I am to say that this Government is in entire agreement with these societies in the matter and that it would be a source of much gratification not only to the Government, but also, his Excellency is sure, to the people of the colony as a whole if you could find it convenient to arrange for holding the Conference next year in this island. His Excellency need hardly assure you that this Government would heartily co-operate with you to make the Conference a success in every way.

Selling Bananas. The importations of bananas at Boston during last year amounted to 2,906,449 bunches. They were received from Jamaica, Costa Rica, Cuba, and San Domingo. The United Fruit Co. is now selling the bananas at a fixed rate per lb. By this method one buyer does not get a load of heavy fruit, while another, paying the same price for the same grade of fruit, receives a load of light-weight bunches. W. W. & C. R. Noyes are selling their cargoes according to the old system of a fixed price per bunch. The Atlantic Fruit Company, which has recently entered the Boston banana market, has introduced the auction system, which is used in New York by several banana importers. In general, it is said that the history of the auction system has been lower prices than under the other methods. (*The Journal of Commerce.*)

* It should, however, be mentioned that on some estates in Barbados, B. 147 has given good results on a comparatively large scale. [Ed. A. N.]



WEST INDIAN FRUIT.

PACKING BARBADOS BANANAS.

In the accompanying figure (for permission to publish which we are indebted to the courtesy of Messrs. W. Pink & Sons), crates of bananas are shown ready for shipment from Barbados. The method of packing bananas that has been recommended at Barbados by the Imperial Department of Agriculture was thus described by Mr. J. R. Bovell in a paper on the Fruit Industry at Barbados, read at the recent Agricultural Conference:—

In packing the bananas great care should be taken that the fruits have not even the slightest bruise. Bunches containing fruit that is bruised, however slightly, should not be shipped. Each bunch should be wrapped first in cotton wadding and then in paper. Strings of shag (the sheaf of

midrib) to form a bed about 1 inch thick when pressed by the weight of the bunch. This will prevent the under side of the bunch from coming into contact with the crate.

Having placed the bunch in the crate, gradually stuff the dried leaves round it, until sufficient have been put in to prevent the paper from unwrapping. Now cut the 'shag' string and draw it out, and continue packing until the bunch is firmly fixed in the crate. The remainder of the slats should be nailed on as they are needed to keep the packing in its place.

JAMAICA V. BARBADOS BANANAS.

The following is a letter addressed by Mr. J. R. Jackson, A.L.S., to the editor of the *Western Morning News*:—

Sir,—In an extremely interesting article in your issue of January 19 last on the above subject, where comparisons are drawn between the qualities of the Jamaica and the Barbados fruits, and much valuable information is given on the subject generally, which cannot fail to be of interest to everyone who wishes well to our West Indian Colonies, there is one passage to which I may, perhaps, be allowed to take exception. It occurs in the paragraph on the advantages of packing, as is done with the Barbados fruit, over the 'naked' system under which the Jamaica fruit is shipped. The writer says:—'We have before now pointed out the erroneous nature of the views held by Sir Daniel Morris, the Imperial Commissioner of Agriculture in the West Indies, in respect to banana packing. It is a mistake to advise the marketing of bananas in a state of nature, so to speak. We are told that the Jamaica banana can be shipped naked, and arrives in England in good condition. But to this system, which was most unfortunately adopted from the start, the low estimate of value put upon the Jamaica banana in the English markets is due.'

From what I know of Sir Daniel Morris' views on the subject—a knowledge confirmed by the reports of his speeches and by his writings in the official publications of the Imperial Department of Agriculture—these views appeared to me distinctly contradictory to those with which he is credited, and this is confirmed in a letter just to hand from him in which he says: 'As you can easily understand,



FIG. 11. BARBADOS BANANAS READY FOR SHIPMENT.

the banana leaf) should be lightly wrapped round the sheets of paper to keep them in position while the bunch is being put into the crate. Having wrapped the bunch of bananas, put into a crate, on which only half of the slats have been nailed, a sufficient quantity of dried banana leaves (the blades or thin portions of the leaf on each side of the

I hold no such erroneous views as are attributed to me in the *Western Morning News*. The shipment of the Jamaica bananas to New York began in a small way about thirty years ago, i.e., before I came to the West Indies. As it was found that the fruit carried very well to New York without being packed in crates, that plan was generally adopted and has been continued to the present time. When the question came up for Jamaica fruit to be brought to England, I was the first to urge on Sir Alfred Jones the desirability of packing the Jamaica bananas in exactly the same way as the Canary bananas, but I was assured that, owing to the enormous quantity shipped at one time, it would be impossible to find crates enough for the purpose. Further, I was informed that the price likely to be obtained for Jamaica bananas would not justify placing them in crates as they are intrinsically not so good as the Canary and Barbados sorts. It is singular how this misapprehension of my views has come about. I suppose it is because I have accepted the position taken up by the exporters of Jamaica bananas as inevitable.

I think it is only right, considering the excellent work that has been, and is still being, done in the West Indies by the Imperial Department of Agriculture that Sir Daniel Morris' correct views on this important subject should be known.

(Sgd.) JOHN R. JACKSON.

AGRICULTURE IN THE LEEWARD ISLANDS.

The following interesting summary of agricultural operations in the Leeward Islands is extracted from the *Annual Report* on the colony for 1903-4:—

The estimated acreage of cultivated land in Antigua is 16,481 acres out of 52,794 acres, in St. Kitt's-Nevis (exclusive of Anguilla) 18,268 out of 75,520 acres. In Dominica there are about 177,549 acres of uncultivated land, of which about 80,000 are Crown lands suitable for cultivation.

Sugar constitutes the chief agricultural industry of Antigua, St. Kitt's-Nevis, and Montserrat; the production of lime juice, essential oil of limes, and cacao forms the main industries of Dominica, while considerable quantities of lime juice are exported from Montserrat.

In Antigua there are established ten, and in St. Kitt's nine, local sugar experiment stations, where experiments are being carried on, in order to select and introduce into local cultivation the most productive varieties of sugar-cane, and also to ascertain the manurial requirements of the sugar-cane under the special conditions prevailing in various localities. The work at these stations is carried on jointly by officers working in connexion with the Imperial Department of Agriculture and by the planters. The experiments are followed with great interest; reports of the work done are published annually and have had an important bearing on the work of the sugar plantations. The cultivation of new varieties of sugar-cane continues to make progress throughout the colony; as a consequence diseases of sugar-cane have occasioned comparatively little loss of late years. The manurial experiments have also afforded results of importance calculated to lead to economies and precision in working, and thereby to afford substantial monetary savings.

In Antigua there has been maintained in connexion with the Botanic Station a small station for the experimental cultivation of various economic plants other than sugar-cane; here experiments have been conducted with yams, sweet potatoes, eddoes, guinea corn, corn (maize), beans, cotton, and

a variety of other products of interest. Similar work has also been done in connexion with the Experiment Stations in Montserrat, and a small station of a like nature has been started in St. Kitt's.

The cultivation of cotton has attracted much attention during the year. The British Cotton-growing Association has given valuable assistance in the way of money, machinery, and advice, the energies of the association being largely directed through the Imperial Department of Agriculture. A ginnery, with a steam engine, an oil engine, three gins, and a baling press, has been erected in Antigua. A ginnery has been erected in Nevis by private enterprise, assisted by the British Cotton-growing Association. In St. Kitt's the operation of the privately-owned ginnery has been continued. In Montserrat one privately-owned ginnery and two ginneries assisted by the British Cotton-growing Association have been steadily worked. The cultivation of Sea Island cotton has been widely extended, a considerable acreage being placed under this crop in each island, except Dominica, which is not thought so suitable for the industry. The cultivation promises to be successful, though obviously those embarking in it will have to acquire skill by experience, and some years must elapse before the best results are realized. The industry is likely to be of great importance to Montserrat, Nevis, and Anguilla, where the sugar industry is carried on under difficulties.

The lime industry of Montserrat appears to be fairly and substantially re-established. In Dominica this industry has been making steady progress, though adverse circumstances seriously reduced the output in 1903.

The cultivation of cacao has been steadily extended in Dominica, and is of growing importance to that presidency.

Onions continue to be successfully shipped, chiefly from Antigua, though the cultivation of this crop is now being taken up in Montserrat, St. Kitt's-Nevis, and the Virgin Islands.

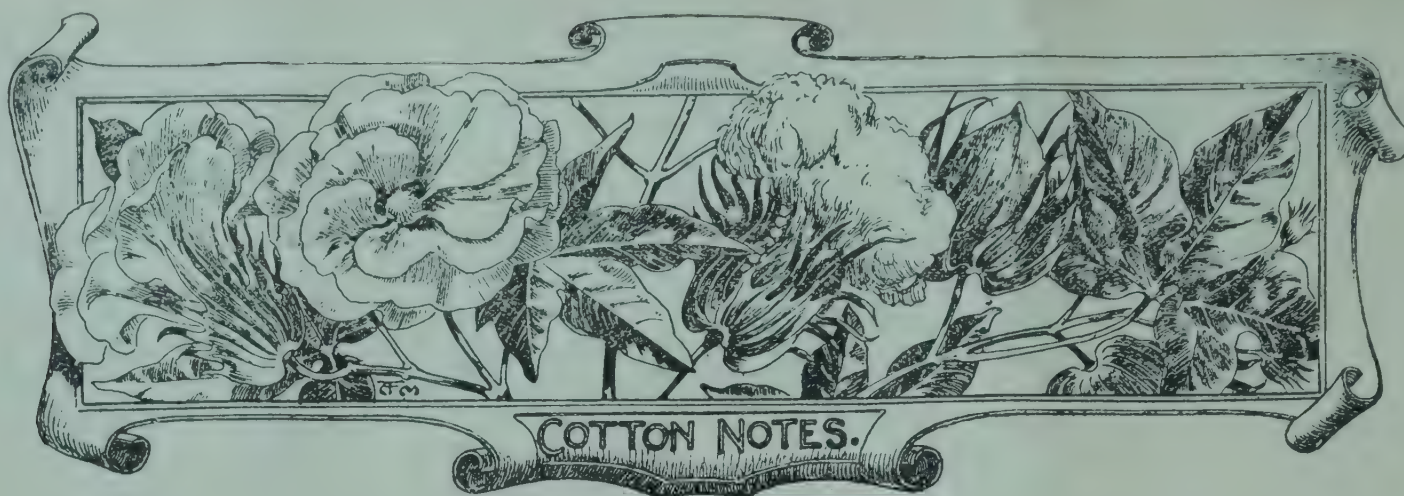
The pine-apple industry of Antigua continues to be energetically carried on, considerable shipments being made.

Botanic Stations or their equivalents, are established in every presidency, and herein are conducted experiments with, and experimental cultivations of, various plants adapted to local conditions, either with the object of improving the cultivation of established kinds, or of introducing improved varieties, or of introducing entirely new plants with the hope of establishing new industries. These stations serve as centres from which economic plants are distributed to local cultivators, who readily avail themselves of the facilities thus offered.

The cultivation of tobacco on an experimental scale has been continued in Antigua and St. Kitt's. From results obtained at the latter island, there appears to be reasonable ground to hope for the establishment of a cigar-tobacco industry there in the course of time, as the soil appears very suitable for the cultivation of tobacco of that grade.

Agricultural Shows have been held each year in Antigua and Dominica at the instance, and under the direction, of the Imperial Department of Agriculture. At these shows prizes are awarded by the Department and the local Governments for the best exhibits in each class of a widely comprehensive list, and thus much is done to further the economic industries of the islands.

The *West Indian Bulletin*, or journal of the Imperial Department of Agriculture (quarterly), affords much information concerning the work of the Department in the Leeward Islands and elsewhere. A fortnightly publication of the Department, the *Agricultural News*, affords information on current events of agricultural interest.



COTTON INDUSTRY.

Ratooning Cotton.

In view of the very strong recommendations already made by this Department against ratooning Sea Island cotton, it is hoped that planters will not adopt so injurious a practice anywhere in these colonies. If further evidence were necessary in support of the policy advocated by the Department, it would be found in the following extract from a letter received from Mr. Charles M. Wolstenholme, the well-known Cotton Broker of Liverpool, dated April 11 last:—

I hope you will be able to stamp out the ratooning of Barbados and St. Vincent cotton. The planters may find it to pay for one season, but it spells ruin for the industry.

When once West Indian cotton proves inferior to Carolina it will be relegated to the category of Florida and Georgia, and will be looked at with suspicion.

The moral is: *Don't Ratoon.*

West Indies.

The following note on the cotton industry appeared in the *West India Committee Circular* for April 11, 1905:—

It will be remembered that in April last year, when a conference took place between representatives of the British Cotton-growing Association and the West India Committee, we suggested the advisability of cotton experts being sent out to the colonies. An effort was made to induce the Government to provide funds for this purpose but they did not see their way to do so.* The British Cotton-growing Association then generously decided to make a grant to strengthen the hands of the Imperial Department of Agriculture in this direction. This has enabled Sir Daniel Morris, the Commissioner of Agriculture, to secure the services of Mr. T. Thornton, who has been appointed cotton inspector in the West Indies. His work will consist of visiting the various plantations and giving advice where necessary. At present, he is specially engaged in making a careful microscopical examination and testing the strength of the fibre. He will also make careful note of whatever pests appear, and make provision for their extermination. It is unnecessary to add that this action of the British Cotton-

* This is not so. On the recommendation of the Imperial Commissioner of Agriculture the Treasury approved of a grant of £200 for this purpose. [Ed. A. N.]

growing Association is very warmly appreciated in the West Indies.

Cotton is now coming forward very freely from the West Indies and the quality seems to be well maintained. During the past fortnight 403 bales were imported into the United Kingdom. Medium fine is quoted 5·05*d.* per lb.; and West Indian Sea Island, medium fine, 12½*d.* per lb.; fine, 13½*d.* per lb.; and extra fine, 15½*d.* per lb.

THE CACAO TRADE.

Figures given in the *Grocer* and statistics from the Board of Trade show that the importations and stock in the United Kingdom and London alone for 1904 exhibited a great increase over those in 1903, and the quantities of cacao exported, on the contrary, showed a very material decrease as compared with those in the previous year; the total quantity of cacao duty paid in this country during 1904 is equal to 45,313,072 lb., or 4,125,721 lb. more than in 1903. Trinidad supplies, as will be seen, have been excessive, and after such stiff rates as 72*s.* to 76*s.* were current for ordinary to good red, as little as 56*s.* to 64*s.* was accepted later in the year now closed. Grenada cacao, nearly always preferred by the trade, at first fetched the extreme market value of from 50*s.* to 60*s.* 6*d.*, but in sympathy with the depreciation of other sorts the final quotations last year fell back to 52*s.* to 57*s.* for fair to good quality. Amongst other British West India sorts as regards weight of supply and excellence of quality, Dominica at the best periods was taken at from 50*s.* to 61*s.* 6*d.*, and at the worst times as low as 48*s.* 6*d.* to 54*s.* per cwt. African cacao increases in extent and influence each year, often controlling the tendency of the market as a whole, more especially at the chief entrepôt of Liverpool, where the heaviest importations are received and disposed of at such very reasonable rates as seldom fail to induce free purchases for both home and export purposes.

Castilloa Planting in British Honduras.

Mr. Eugene Campbell, Curator of the Botanic Station at Belize, British Honduras, writes: 'We are now taking up the planting of *Castilloa* trees on crown lands. This I consider a very important move, as there is, probably, no better place for the Central American rubber tree than British Honduras, and every effort should be made to demonstrate its value and the most suitable methods of cultivation. A few days ago I met Mr. O. F. Cook, of the U. S. Department of Agriculture (Author of *The Culture of the Central American Rubber Tree*), who has been travelling in Guatemala and Mexico. He informs me that he has discovered that there are at least four distinct species of *Castilloa*, but he is not yet in a position to say which of them is likely to be the most profitable one to grow.'

WITCH BROOM DISEASE OF CACAO.

The following article containing hints for the treatment of the 'witch broom' disease of cacao appeared in the *Demerara Daily Chronicle* of April 19:—

Since it has become known to the public that 'witch broom' has been found by the Government Botanist and the Instructors in Agriculture on an estate up the Demerara river, it behoves all cacao planters to keep a sharp look-out for this destructive fungoid disease, which has done so much damage to the cacao industry in Surinam. As far as is known, the disease is only on one estate in the colony, and it is with the idea of preventing it from spreading to other estates, that these notes are written.

THE SYMPTOMS OF THE DISEASE.

'Witch broom' consists of curiously swollen, gouty and abnormal twigs, bunched together and growing in tufted masses from the normal stems of the tree. The trees, when attacked, very soon give up bearing healthy pods, as the pods of a tree attacked by 'witch broom' are themselves attacked by a fungus which makes them become hard and woody and absolutely useless. The productiveness of the tree is so seriously impaired that it is found most advisable to cut down any tree that may be attacked and to burn it, with the hope of checking the spread of the disease.

The disease seems to have been first noted in 1898 when, it is understood, specimens were forwarded to Professor Ritzema Bos, of Amsterdam, who discovered fruiting organs of the *Exoascus* type, on the underside of some of the rudimentary leaves borne on the tufts of 'witches' broom.'

Professor Ritzema Bos considered that the disease was due to a new fungus. The disease has been studied by Professor F. C. Went, of the University of Utrecht, who came out to Surinam, so as to be able to study it on the spot. The conclusion that he came to was that the disease was due to a fungus, but he was unable to say, with any degree of certainty, what that fungus was—owing to the fact that he had been unable to observe any formation of spores.

REMEDIAL MEASURES.

Although little scientifically may be known of the disease, planters know that an estate overrun with this fungus is practically worthless. As the fungus that produces this disease is so little known as to be not yet named, no spores having been observed, it is difficult to suggest any remedial measures beyond the 'axe and fire-stick.' But planters can adopt preventive methods, and we would strongly advise every cacao grower, on the Demerara river especially, to adopt some methods of a preventive nature. The following measures should be adopted to keep trees in as healthy and as sound a condition as possible. Healthy and vigorous growing trees are the least likely to be attacked by any prevailing disease.

PREVENTIVE MEASURES.

1. Attend more carefully to your pruning. Follow your pruners and insist on their making clean, smooth cuts, close to the stem, and well rounded, so that the bark has every chance of healing over the scar.

2. Tar all wounds and cuts.

3. Remove all diseased pods and branches and burn them. All old shells and pods should be buried, with a little lime, and not allowed to remain in the fields—hot-beds for any fungoid diseases. If burning the pods be too expensive or inconvenient, break them at the factory and throw them (if your estate is on the river's bank) into the river, to be taken away with the tide.

4. Improve the health of your trees by careful forking and by keeping your estate *well drained*. Bad drainage is at the bottom of many more diseases than you would think possible.

5. Do not overshadow your trees.

6. Have a daily watch kept for the first signs of this disease, and should it appear on any tree, cut it out and burn it at once.

A MODEL CACAO ESTATE.

One of the best-drained cacao estates in the colony is plantation Coverden on the Demerara river, and although the area is large, consisting of nearly 340 acres, yet this estate is singularly healthy and almost free of any dangerous fungoid diseases. This is due to the good drainage of the estate, and to thorough and good cultivation. Let all cacao growers bear this in mind and give their trees the best of drainage and the best of cultivation that their means can afford.

SPECIMENS OF WITCH BROOM.

It is advisable for growers to pay a visit to the office of the Government Botanist, for the purpose of seeing specimens of 'witch broom' so that, should it appear on their estates, they would at once recognize the disease. It has to be seen but once, when it will be readily recognized on any other occasion.

ECONOMIC PLANTS FOR SALE.

The following is a list of economic plants in pots (and in beds) available for sale at the Botanic Station, Grenada. Applications from other colonies should be addressed to the Hon. the Colonial Secretary, St. George's, Grenada. The cost of the plants vary from 1*d.* to 3*d.* each—packing and freight extra:—

Achras Sapota	Cola acuminata (Kola)
(Sapodilla or naseberry)	Enterolobium Timbouva
Acoumar (Timber)	Eugenia caryophyllata (Clove)
Anona muricata (Sour sop)	Funtumia elastica (African)
„ squamosa (Sweet sop or sugar-apple)	Rubber tree)
Anona Cherimolia (Cherimoyer)	Ficus Vogelii
Averrhoa Carambola (Carambola)	Hevea brasiliensis (Para. Rubber)
Basella cordifolia	Jatropha multifida
Blighia sapida (Akee)	Mangifera indica (Mango).
Carica Papaya (Papaw)	(Grenada Ceylon)
Castilloa elastica	Mangifera indica (Grafted).
(Central American Rubber)	Ceylon, No. 2.
Casuarina equisetifolia	Mangifera indica (grafted Peters)
Catalpa longissima	Mangifera indica (various kinds)
Cedrela odorata (West Indian Cedar)	Melicocca bijuga (Genip)
Citrus Aurantium (Sweet Orange)	Myristica fragrans (Nutmeg)
„ „ (var. Portugal)	Passiflora laurifolia (Water lemon)
„ „ (var. Navel)	Pereskia aculeata (Barbados gooseberry)
„ „ (var. Mandarin)	budded) Persea gratissima (Avocado)
„ „ (var. Tangerina)	Pear)
„ medica (var. acida)	Psidium Guaya (guava)
Coffea liberica (Liberian Coffee)	Sapindus inaequalis
„ arabica (Arabian Coffee)	Terminalia Catappa (Almond)
„ stenophylla	Theobroma Cacao (Cacao)
	Vanilla planifolia (Vanilla)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with the arrangements that have been made for the representation of the West Indies at the Colonial and Indian Exhibition to be held at the Crystal Palace during the present year.

Sugar planters will find matters of interest on pp. 130-1 in reference to the Naudet process for extracting sugar and the sugar-cane experiments that are being carried on in British Guiana.

An illustrated article containing directions for packing Barbados bananas will be found on p. 132; also a letter written by Mr. J. R. Jackson in reference to the general question of the advisability of shipping bananas in crates.

The article on p. 135 deals with the treatment of the witch broom disease. On the same page is a list of economic plants on sale at the Botanic Station at Grenada.

A further contribution to the discussion on the subject of the immunity of Barbados from malaria will be found on p. 138.

On p. 141 is the concluding portion of the article on the preparation of honey for the market, commenced in the last issue of the *Agricultural News*.

An interesting note on keeping poultry in conjunction with gardening will be found on p. 143.

St. Vincent Cotton.

In the *St. Vincent Sentry* of April 14 last, considerable space is devoted to the subject of cotton growing in that island. Reference is made to the excellent prices that have been obtained for the shipments of cotton recently made from that island, and to the refusal of the Sea Island planters to sell seed for planting in the West Indies. 'We are glad to observe, however,' it is stated, 'that the Imperial Department of Agriculture has made excellent provision to meet the emergency, and local growers need have no fear that the industry can be materially hampered by the action taken in South Carolina.'

We are glad to acknowledge the assistance that has been afforded by the *Sentry* in connexion with the establishment of the cotton industry. It is obvious that its editor realizes the important part the industry is likely to play in the improvement of the agricultural condition of St. Vincent.

Supply of Cotton Seed.

It is gratifying to learn that the arrangements proposed by the Imperial Department of Agriculture for supplying 'selected and disinfected cotton seed,' grown in the West Indies, and guaranteed to be of the highest quality, have received general support in these colonies.

The principal supplies of such seed are obtained from estates in St. Vincent, Barbados, and St. Kitt's that have obtained the best prices (16½d. to 17d. per lb.) for their produce during the current season. The seed will be selected by hand and disinfected and delivered freight free to any part of the West Indies at the rate of 5c. per lb. In the event of any profit arising from the transactions, this will be divided *pro rata* (as was the case last year) amongst the persons who purchased the seed.

In order to assist growers who desire to plant their own seed for experiment purposes this will be 'hand-picked and disinfected' by the Department on payment of cost price.

It is particularly recommended that only the best seed be planted this year and that no one will plant (even his own) seed without having it carefully selected and disinfected beforehand.

The experience this year has shown that those who planted the best disinfected seed obtained higher prices (ranging from 4d. to 5d. per lb.) for their cotton than those who planted inferior seed. The question of carefully selecting the seed is a vital one as affecting the future of the Sea Island cotton industry.

Preparation of Honey for the Market.

In view of the efforts that are being made in the West Indies to establish a trade with the United Kingdom in honey, the article on 'The preparation of Honey for the Market' that is reproduced from the *Journal of the Board of Agriculture* (Great Britain) should be carefully read by all bee keepers in these islands. Clear and explicit directions are given in that article for preparing the first-class kinds of honey

that are required in the British trade, and it is stated that, to command a ready sale for his honey, the bee keeper must strive to attain that standard.

Stress is laid on the necessity for grading the sections and directions are given as to packing them. Further, the desirability of rendering them as attractive as possible is urged.

The marketing of extracted or 'run' honey is also dealt with. Here, again, it is particularly necessary that the product should be carefully graded, since the different grades are put to different purposes.

Dominica.

The following gentlemen have been appointed members of an 'Agricultural Experiment Committee' to confer with the Imperial Commissioner of Agriculture in regard to efforts that are being made to improve the lime, cacao, fruit, and other industries:—

Messrs. E. A. Agar, C. Blandy, P. F. Cox, E. Downing, F. Everington, J. Cox Fillan, M. Fletcher, H. A. Frampton, Joseph Jones, Dr. H. A. Alford Nicholls, C.M.G., and Mr. A. C. Shillingford.

His Honour the Administrator has consented to be the Chairman of the Agricultural Experiment Committee.

Cacao Diseases in British Guiana.

Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist, British Guiana, recently visited the more important cacao estates along the Demerara river in order to investigate an alleged outbreak of cacao pod disease.

Mr. Bartlett on his visit found one estate very badly infected with the Surinam witch broom disease. The estate was in a badly neglected condition, consequently the disease had been allowed to spread unchecked until it had gained a fair hold and is now distributed, more or less, over the whole cultivation. An account of the treatment to be adopted for dealing with this disease will be found on p. 135.

As mentioned in the last issue of the *Agricultural News*, Mr. Bartlett also reports the presence of the thread disease of cacao in British Guiana. This was found on a few isolated trees on two estates. Apparently on these estates the disease does not spread rapidly.

On all the estates along the Demerara river a certain number of diseased pods were found. Their abundance appeared to be in inverse ratio to the quality of the drainage, cleanliness of the beds, and the care taken of the trees.

Most of the pod disease would appear to be due to *Phytophthora omnivora*. In the middle of many of the black diseased areas on the pods a delicate white incrustation was seen, which on microscopic examination showed the conidia of this fungus. The fungus causing 'brown rot' disease of the pods (*Diplodia cacaoicola*) was present on decaying husks, etc., among the trees: it could not, however, be recognized as causing any of the diseases.

The Cacao Trade.

Several important facts are brought out in the note on the cacao trade which is published on p. 134. First of all, the importations and stock of cacao in the United Kingdom during 1904 'exhibited a great increase over those in 1903.' On the other hand, there was considerably less cacao exported from the United Kingdom during the year than during 1903.

The range of prices obtained by West Indian cacao is also of interest. It will be seen that the price of the Trinidad product was as high as 72s. to 76s. per cwt., the lowest prices being from 56s. to 64s. Grenada cacao ranged from 50s. to 60s. 6d. down to 52s. to 57s., while that from Dominica ranged from 50s. to 61s. 6d., as top prices, down to 48s. 6d. to 54s. at the worst times.

Finally, it is mentioned that the African cacao trade is increasing every year. It will, therefore, be well for West Indian cacao planters to realize that, although the consumption of this article is on the increase, great care must be taken in curing and preparation with a view to placing on the market only a good-grade product which will sell well at top prices.

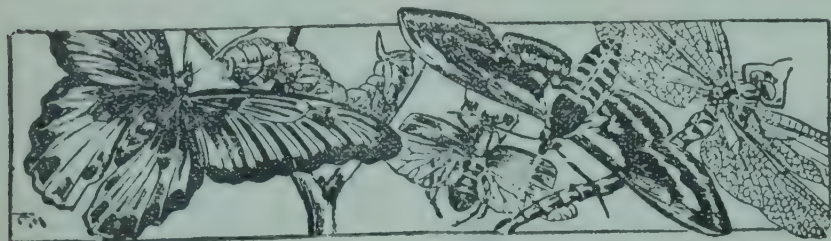
The Banana Trade.

Fruit trade journals received by last mail contain references to the second show of colonial fruit held by the Royal Horticultural Society, and also to a paper by Mr. Frank Pink of the firm of Messrs. W. Pink & Sons, read at a recent meeting of the society. This paper dealt with 'Bananas from a commercial point of view.' Mr. Pink referred to the establishment of the Jamaica banana industry, and to the efforts that have been made to ship bananas from the other West Indian Colonies.

Referring to the Barbados banana, he said: 'Unfortunately, though one of the easiest fruits to grow, it is one of the most difficult to transport.'

In the reports of Mr. Pink's paper we observe several inaccuracies. As these are not likely to have been made by Mr. Pink, it would be as well to correct them here. It is stated that transit from Barbados occupies six to eight days; this should, of course, be ten to eleven. Again, it is stated that 'in British Guiana, Trinidad, and Barbados, the grower packs his own fruits, and then hands them over to the Imperial Department;' so far, this has been done only in Barbados.

It is stated that the bananas from Barbados exhibited by Messrs. W. Pink & Sons, which were of the same variety as grown in the Canary Islands, were in splendid condition and colour. This variety will, doubtless, find a ready sale amongst high-class fruiterers for dessert fruit. That the coarse type of fruit received from Jamaica will always meet with a sale amongst the working class we do not for a moment doubt, but the sale will be limited; whereas, if it were of the same type as the Canary Islands produce, the sale would be practically unlimited.'



INSECT NOTE.

Termites or White Ants.

Few insects in the tropics do greater damage to property than the termites or, as they are more commonly called, 'wood ants,' or 'white ants.'

In reality the termites are not ants, as the term is usually applied, but are more closely related to the dragonflies. They have, however, a social arrangement in their colonies similar to that found among the true ants, and it is probable that for this reason these insects were called ants.

There are many instances of the destructiveness of the termites, and probably every resident in the tropics has had proof of the rapidity with which these insects work. They are all miners in habit and carefully avoid the light. When it becomes necessary to come to the surface of the ground or to travel on the outside of tree trunks or timbers, they build covered ways in which they travel. They live upon the fine particles of the material in which they tunnel. In addition to destroying timbers and other wood-work of houses, bridges, posts, fences, furniture, picture-frames, books and papers, they also attack living plants. In Florida, orange and other trees have been damaged by termites girdling them below the surface of the ground; in Georgia they have injured potatoes in the ground; and in Barbados, Ipomoea plants have been destroyed by them.

Termites are very difficult to combat especially after they are established. If the location of the nest is known, the insects can be killed by the use of creosote or any creosote mixture, kerosene, or carbon bisulphide. The covered ways should be destroyed wherever seen.

Timbers for posts or for use in buildings should be treated with tar, creosote, or some other preservative, wherever they are to come in contact with the earth or masonry walls. Chairs should not be allowed to lean up against the walls of the houses, and books, picture-frames, etc., should be frequently examined and exposed to light and air, and when found infested with these pests, they should be promptly treated as suggested above.

IMMUNITY OF BARBADOS FROM MALARIA.

A note appeared in the last issue of the *Agricultural News* in which it was mentioned that a theory had been propounded by Mr. C. Kendrick Gibbons, of Collynn, Barbados, that the immunity of Barbados from malaria was due to the presence in the swamps and ponds of the island of large numbers of tiny fish, known as 'millions.' The *Anopheles* mosquito, the carrier of the malaria parasite, is not present in Barbados; the common mosquitoes found in that island are *Culex fatigans* and *Stegomyia fasciata*. The following is a letter that has been received on this subject from Mr. Gibbons:—

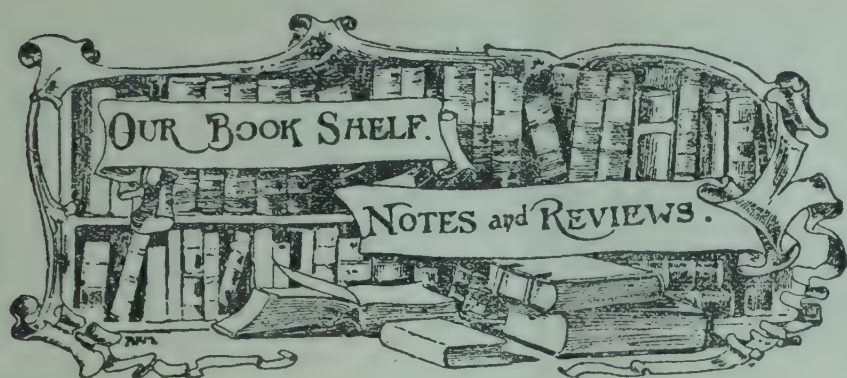
In your issue of April 22, you call attention to a weak point in my theory, which you say appears to

have escaped notice. The particular weak point alluded to exists only because the writer assumes that the habits of the *Anopheles*, the *Culex fatigans* and *Stegomyia fasciata* are similar, which does not appear to be the case. I do not attribute any selective action to the 'millions,' our ponds and swamps are free from the larvae of the *Culicidae* generally, if any variety deposit their eggs therein, no doubt their larvae are destroyed by the fish as effectually as are the larvae of the *Anopheles*; assuming the *Anopheles* is imported here, which I think highly probable, there is nothing in my idea, if it is not, and the immunity of Barbados from malaria is due to something else. But while the *Culex* and *Stegomyia* avail themselves of tanks and other receptacles for water, to deposit their eggs in, where the 'millions' do not naturally exist, and so perpetuate their species, the *Anopheles* do not appear to do so. To quote Major W. M. Hodder, R.E.—by the by, whose pamphlet on the *Destruction of Mosquitos* is reviewed in this very issue—who states in his chapter on the habits of mosquitos, that the *Culex* 'breed in gutters, water tanks, and filthy pools in back-yards with equal facility. Their larvae can be found in the gutters of high buildings or on the ground level. So far as my observation goes, such is not the case with the *Anopheles*; they do not deposit their eggs anywhere except close to the ground level. I have examined hundreds of tanks 4 or 5 feet above the ground, but in not one single instance have their larvae been found therein, although the tanks were actually standing on the ground where these mosquitos lived.'

It is obvious if the habit of the *Anopheles* only permit them to deposit their eggs in water on the ground level, and that water abounds with fish which destroy their larvae, that that variety of mosquitos must be exterminated in that locality.

Mr. Gibbons is of the opinion that the note in the *Agricultural News*, to which he refers, indicates that the writer assumed that the habits of the various kinds of mosquitos are similar, and goes on to prove that this is not the case. Literature on this subject shows that observations made in different parts of the world indicate that *Anopheles* is very rarely found in vessels of water, flower pots, and such receptacles in which *Culex* is usually to be seen. This point of difference appears to be generally recognized. The point of difference upon which Mr. Gibbons lays special stress, however, is that *Anopheles* is not found more than a few feet above the ground-level. If Major Hodder's observations on this point are borne out in other parts of the world, the criticism would therefore be disposed of.

Mr. Gibbons' argument is that *Culex* and *Stegomyia* have not been exterminated in Barbados because they breed in places in which the 'millions' are not likely to be found. That may certainly be the case. But the further argument that these fish are more or less certain to be found in all places that the *Anopheles* would be likely to select as breeding places would appear to admit of considerable doubt. We are of opinion that there are many pools and ponds in Barbados in which *Anopheles* might breed—ponds in which the 'millions' would not be found. Of the natural breeding places of *Anopheles*, Howard states in his *Mosquitos of the United States*: '*Anopheles* will always be found to breed most abundantly in fairly permanent stagnant pools of water uninhabited by fish, but more or less covered with green scum.'



UGANDA PROTECTORATE: LIST OF PLANTS UNDER CULTIVATION AT THE BOTANIC GARDENS: Entebbe, Uganda, 1904.

This list is issued by the Scientific and Forestry Department of the Uganda Protectorate. It is stated that this is the first list of its kind to be issued in Uganda; it applies, however, exclusively to the district of Entebbe. The plants are all being grown in the Botanic Gardens, and are either indigenous or have been introduced. In each case the degree of success which has attended the culture is denoted. Many plants, which otherwise do well, are attacked by termites and frequently die a premature death in consequence.

The common names of foreign plants are given, as also, where possible, the native names of indigenous plants.

There is no doubt that the value of this list would have been greatly enhanced by the inclusion of information in respect to the altitude, rainfall, temperature, etc., to which each plant is suited, as is usually given in similar publications in other tropical countries.

DISEASES OF CATTLE: A special report of the Bureau of Animal Industry, U. S. Department of Agriculture. Revised Edition. Washington: Government Printing Office, 1904.

This is a companion volume to the Report on *Diseases of the Horse*, which was reviewed in the *Agricultural News*, Vol. III, p. 27. The popularity of this report is shown from the fact that since it was first issued Congress has ordered the publication of several new editions. It is a popular work prepared in the first instance for farmers and stock owners and contains much useful information of a practical character. It has been prepared by a number of prominent members of the veterinary profession in the United States, and may therefore be regarded as a safe and reliable guide for stock owners and farmers all the world over, to whom, on account of its freedom from technical terms and expressions, it should prove very welcome.

The volume contains no fewer than fifty-two excellent full-page plates and twelve figures. It deals with the administration of medicines, the diseases of the various organs, accidents, infectious diseases of cattle, animal parasites, etc., etc.

Barbados Blackbirds in St. Kitt's. On his visit to St. Kitt's in February last the Imperial Commissioner of Agriculture took with him fifteen Barbados blackbirds as a present to the Administrator with the idea of again attempting to introduce these useful birds into that island. They were kept for some weeks in a large cage and then set at liberty in the grounds at Springfield, the residence of the Administrator. This attempt to introduce these birds into St. Kitt's gives every promise of success.

TRINIDAD CACAO SOILS.

Some geological notes on cacao soils by the Trinidad Government Geologist have recently been issued as a Council Paper (No. 5 of 1905). They have been written to render the geological maps of greater value to the agriculturist. The following is a short summary of this interesting paper:—

In the opinion of planters the most favourable soil for cacao is a 'loose clay, or clay with an admixture of a fair proportion of sand and lime.' Very many rocks in Trinidad are capable of yielding, under disintegration, soils coming under this somewhat comprehensive description.

(1) The alluvium of rivers is made use of for planting in cacao to a great extent. Alluvial soils vary considerably in character and composition. They have the advantage of being flat and easily worked; the situation is usually well sheltered, watered, and convenient for transport. On the other hand, difficulties may arise in draining and liability to floods.

(2) The clays of the Tertiary series afford soils, which, though rich as regards chemical constituents, are seldom so suitable for cacao cultivation as regards mechanical condition. They are usually very stiff and impervious, requiring a great deal of drainage when the land is level, and being liable to landslips on hilly or undulating ground. Forking around the trees and the addition of pen manure must evidently have a favourable effect on these soils.

(3) The marls of the Tertiary series form the well-known 'black soils' of the cane plantations. They form excellent soils both from a chemical and a mechanical point of view. They contain a considerable percentage of lime and other bases, distinct porosity, and, on account of the undulating ground they form, are easily drained. Some of the best cacao in Trinidad is grown on these marls. Liming and forking are obviously unnecessary, but phosphatic and nitrogenous manures may form valuable additions to the soil.

(4) The sandy clays of the Tertiary series form soils which are admirable as regards mechanical conditions, being neither too light nor too heavy, and draining readily. Basic slag and farmyard manure will probably be beneficial.

(5) Tertiary sandstones yield soils which are usually too light for good results. They rapidly become exhausted unless manuring is resorted to.

(6) The Tertiary limestones form the best cacao land in Trinidad. They form fairly porous soils with plenty of lime; they occur in well-marked ridges which drain easily; they disintegrate irregularly, leaving blocks and masses amid a lighter friable soil, thus preserving the surface from being washed away. Liming and forking will not be required, but basic slag and pen manure might be used with effect.

(7) The shales and limestones of the Cretaceous formation have not been planted in cacao to any extent. But considerable areas in the high-woods are formed of these rocks, and, as the land becomes opened up by roads, it will probably be found that valuable cacao estates can be established. The sandstones give light, barren soils upon which cacao could not be grown profitably; the clays and shales, on the other hand, ought to provide excellent soil.

Banana Trade. At a meeting of the Colonial Bank on April 6, the Chairman said: 'I think now the future of bananas in this country is assured. We see an enormous amount of bananas all over the place, being retailed at a very low price indeed, and it appears to be becoming to a certain extent, as it is to a very great extent in the United States, a food of a considerable proportion of the people.'



GLEANINGS.

Dr. Watts writes: 'It is interesting to note that fire-flies have been observed in Nevis. It is curious that they have made their appearance within the past year or two in Antigua, Montserrat, and Nevis.'

Two boys who have completed the course at the St. Vincent Agricultural School are now available for employment on estates. Applications should be made to the Agricultural Superintendent, Kingstown.

A few people planted cotton in British Honduras last season, but their efforts did not meet with success on account of excessive rains which caused their fields to become flooded.

The Government of Ecuador pays a bounty of 10c. for each rubber tree planted in any part of the republic, provided the number of trees planted be not less than 500, and that these attain the age of five years.

The *Board of Trade Journal* announces that seven samples of different varieties of tobacco grown in Jamaica have been received and may be inspected at the offices of the Commercial Intelligence Branch.

Dr. H. H. Cousins writes from Jamaica: 'I am referring your circular on cotton disease to certain growers. The industry promises well in Vere and other places where it is too dry to grow bananas.'

An inquiry is being made for cuttings of the single and double white variety of *Hibiscus sinensis*. Those in a position to supply these are desired to communicate with the Editor of the *Agricultural News*, Head Office, Barbados.

A return of the area in cultivation of canes other than Bourbon in British Guiana (15,000 acres), shows a very satisfactory increase in the cultivation of seedlings proper, and an equally satisfactory decrease in the cultivation of the White Transparent.

Specimens of a tiny fish known as 'millions' have been received by the Zoological Society. To test the theory that the presence of this fish in the local waters accounts for the absence from Barbados of the malarial mosquito, careful experiments will be made.

The Sea Island cotton farmers in the United States have perfected their organization for the purpose of limiting the sale of seed, and thus confining the growing of the long-staple cotton to South Carolina. The organization is to be called the Sea Island Cotton Seed Association.

According to the *Gleaner*, the fruit cargo which left Jamaica by the 'Port Kingston' on April 13, was the largest shipment ever taken to England by any of the Direct Line vessels, the bananas alone amounting to over 37,000 bunches.

H.M. Consul at Palermo (Mr. S. J. A. Churchill), in a recent despatch, reports that arrangements are in progress for the establishment at Palermo of a citric acid factory under a system discovered by an Italian chemist. (*Board of Trade Journal*.)

Messrs. W. Pink & Sons write: 'We think you will be pleased to know that we were awarded a silver "Knightian" medal for Barbados bananas at the exhibition of the Royal Horticultural Society. This will be useful for advertising purposes, and has already been the cause of a better demand for the fruit.'

According to the *Antigua Standard*, the notice that lands on Clare Hill and Skerrett's would be rented for cultivation has been responded to with alacrity. This is regarded as indicating that a cane-farming industry in connexion with the central factory at Gunthorpe's is likely to be developed in the near future.

Pamphlet No. 36, entitled *Manurial Experiments with Sugar-cane in the Leeward Islands, in 1903-4*, is issued to-day. This contains a summary of the results already published in the large official report reviewed in the last issue of the *Agricultural News*. This pamphlet can be obtained of all agents for the sale of the Department's publications—price 4d., post free, 5d.

Mr. Richard Stancliffe, who, it will be remembered, accompanied Mr. Oliver on his visit to the West Indies last year as a deputation from the British Cotton-growing Association, has presented to each of the boys at the Dominica Agricultural School a copy of a photograph of the pupils, taken in front of the school buildings on Morne Bruce.

Mr. Arthur M. Lee writes: 'Kindly permit me to correct a clerical error in my letter of March 27 (published in the *Agricultural News*, Vol. IV, p. 102). The amount charged against the cotton for "manuring for cane crop (half cost)" should have been £1 5s. instead of 15s.' The estimated clearance per acre should therefore read £5 7s. 7d. instead of £5 17s. 7d.

At Foursquare the average yield of sugar reported is slightly under 2 hogsheads to the acre: at Kirton in the same district $1\frac{3}{4}$ hogsheads. These figures are better than we expected, when we saw how the canes of that part of the island suffered during the drought of last year. This satisfactory yield is due to the large cultivation of the No. B. 147 canes, which are giving as fine a return as ever. (*Barbados Agricultural Reporter*.)

A joint report by the Government Analyst and the Government Geologist of Trinidad (published as Council Paper, No. 4 of 1905) discusses the possibility of establishing a Portland cement factory in that colony. They conclude that 'the existing and possible future demand for cement ought to be sufficient to lead to the investment of capital on the establishment of a small factory capable of producing not less than 200 tons a week, and capable also of extension to meet further possible requirements.'



BEE KEEPING.

Preparation of Honey for the Market.

The following is the concluding portion of the article on the Preparation of Honey for the Market, commenced in the last issue of the *Agricultural News*:—

For glazing sections, glass cut to the correct size may be purchased of any dealer in bee appliances, together with the strips of paper lace edging, which, when pasted around the angle formed by the glass and wood, serve to fix the glass on. In country towns the local glazier will gladly cut up waste glass to the small size (viz., $4\frac{3}{16}$ inches by $4\frac{3}{16}$ inches) required, and neatly printed bands of coloured paper, 19 inches by 3 inches, can be used instead of the lace edging: they cost about 7s. per 1,000. These bands are more easily pasted on, and make much firmer and neater work, besides giving an opportunity to place the names of the apiary and retailer on each section. Neat cardboard cases, plain or glazed on one or both sides, and glazed tin boxes, are provided by appliance dealers for those who have but a small number of sections to deal with; where larger quantities have to be handled, the printed band holding on the two squares of glass will be found the best and most economical.

The modern method of obtaining 'extracted' or 'run' honey has greatly improved its quality, but the use of the centrifugal extractor demands the abandonment of the skep system of bee keeping, with its waste of bee life, waste of combs, and taint of sulphur, and the adoption of the frame hive which enables the gathered surplus to be stored in frames apart from the brood-nest and removable at will by the bee keeper.

Honey improves in flavour and density while ripening in the hive, therefore the super-frames should not be removed until they are well sealed over. If the bees are given all the storage room they can occupy, so long as there is nectar to be gathered they will bring it home quite irrespective of the quantity already in store. It is a mistake to suppose that by extracting unripened honey and returning the empty combs the bees are induced to work more vigorously.

Fermentation is the great enemy of extracted honey, but it can only affect badly ripened honey or honey exposed to moisture and warmth; so, should it be necessary to extract unripe honey, it should be returned to the bees for re-storing and ripening. Extraction is done by means of a machine consisting of a tinned-iron can, within which is a vertical spindle carrying a pair of cages to hold the frames of honey-comb and made to revolve rapidly by means of a simple hand gear. Before placing the frames of comb in the cages they must be uncapped. To do this quickly, and without waste, special uncapping knives are used. They should be heated in a tin of water kept over a small spirit or oil lamp. The full frame, held by one lug in the left hand, the other lug resting on a large dish and with the top edge overhanging, has its capping removed with the sharp, hot

knife by a gentle, slightly sawing, downward cut, passing just beneath the surface and removing as little as possible of the honey. If held with sufficient overhang, the detached sheet of capping will fall clear of the frame. A pair of frames having been uncapped, they are placed in the cages of the extractor, and made to revolve rapidly with their bottom bars leading; the centrifugal force throws out the honey, and when one side has been emptied, the frames are reversed and the other side is treated in the same manner.

The full sealed frames of comb having been carried into the store-room, should be sorted by holding up to the light, and all those containing dark or second-quality honey separated from the better ones.

Uncap and extract the contents of the best combs, and then strain the honey through a bag made of cheese-cloth which will remove all particles of wax. Tin cans, with strainer and honey tap, made to contain 56 lb. or 112 lb., can be obtained, in which, if the honey is allowed to stand for twenty-four hours after straining, it will be free from air bubbles, and can then be drawn into whatever bottle, jar, or tin will best suit the local market. Best honey is usually put into 1 lb. or $\frac{1}{2}$ lb. glass jars, with metal screw lids, having a cork wad inside the lid. To prevent any leakage the cork wad should be dipped in melted wax and placed on the jar while still warm, the lid being screwed down upon it. A neat label (of which a variety is always obtainable from the appliance makers or of the secretaries of many of the County Bee Keepers' Associations) will set off the honey jar and make it a desirable occupant of a place in any retailer's shop. The darker honey is more suitable for marketing in its granulated state; when extracted and strained it should be run into 14 lb. (or 28 lb.) tins, the contents of these being stirred gently, now and again, while granulating; the stirring tends to produce a more even and finer-grained honey. It may also be run into wide-mouthed glass or earthenware jars, covered down with parchment paper, and stored in a cool, dry place. Dark and coarse-flavoured varieties can be sold for manufacturing and confectionery uses, also for that now almost forgotten purpose, the making of mead.

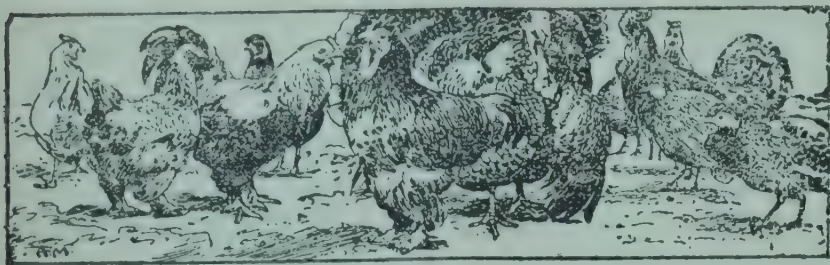
BARBADOS.

Government Industrial School.

The following extracts from the annual report on the above institution for 1904 are of agricultural interest:—

At Summervale plantation the area planted in first crop canes for 1905 is $28\frac{1}{4}$ acres, and that of ratoons is 20 acres. The area for 1906 is $25\frac{3}{4}$ acres of first crop, and there will be about 14 acres of ratoons. From 28 acres of first crop canes and $22\frac{1}{2}$ acres of ratoons the crop for 1904 realized 69 tons of sugar, of which 47 tons were from the first crop and 22 tons from the ratoons. The $28\frac{1}{4}$ acres of first crop canes for 1905 have just been reaped at Carrington plantation and a little over $55\frac{1}{4}$ tons have been made. With the present favourable prices for sugar, it is hoped that the revenue from the crop will be very remunerative.

The cotton crop has been a very abundant one, $8\frac{1}{4}$ acres at the present moment averaging 846 lb. of seed-cotton per acre as a first return. This average would have been higher, about 976 lb. per acre, if the anthracnose disease had not attacked one of the fields. There are also $3\frac{1}{2}$ acres of cotton not yet matured, which should give an average of over 800 lb., as first return, per acre. There will be 14 acres planted in cotton during 1905.



POULTRY NOTES.

Combining Poultry Keeping and Gardening.

The following notes are extracted from the 'Farm and Garden' column of the *Illustrated Mail* of April 8:—

One has often heard the remark, 'you cannot have a good garden and keep poultry at the same time,' but in my opinion the statement is not accurate, and I assert that, within certain limits, it is quite possible to combine the two industries on a small or moderate scale, not only without loss and inconvenience, but even advantageously. To do so, however, there is one point that must be strictly carried out, and that is each must be kept entirely and absolutely apart from each other, the fowls, etc., being either securely enclosed by means of a high fence or wire netting, or else the garden being similarly enclosed from the poultry. No gardener worth the name would tolerate the constant mischief and damage caused by fowls scratching and picking, and it is this point that has given rise to the remark quoted above. However, when separated, as I have said, the advantages gained by a gardener keeping poultry are several. For instance, many of the waste products of the garden, which would otherwise be thrown away as useless, can, when fowls are kept, be profitably employed as food for poultry, while the latter's droppings in their turn are of the greatest benefit to the garden. Among the products of the garden useful as food for poultry, may be mentioned imperfect or over-grown lettuces, cabbages, or the like, defective tomatos, or imperfect fruit, while the spare potatos form a very nutritious and fattening food if boiled and mixed with a little barley or Indian meal. Too much of this mixture, however, should not be given to laying fowls, but when the fattening time comes it will be found most beneficial.

One of the chief advantages of the gardener keeping poultry, however, is the valuable manure formed by the droppings of the birds, for, when properly prepared and applied, this manure is equal in effect to good guano; and may be used in either solid or liquid form. How to use it is not generally known, so I will explain. Where peat moss litter is used on the floors of the fowls' houses or runs, it should, of course, be periodically removed and fresh put down. Now, in this case, all that is necessary is to store up the peat moss litter in a heap as taken from the pens, etc., and add a light sprinkling of lime to sweeten it. When it has thus laid for two or three months it will be found of the greatest value as a fertilizer for celery, peas, beans, tomatos, etc. Where the moss litter is not employed the droppings should be mixed with four or five times its bulk of light, sandy soil, with a dusting of lime as before, and again be laid up for some time to become mellow. Do not use it in a fresh condition. To make liquid manure, put a peck or so of the droppings into a 40-or 50-gallon cask, with a spadeful of soot or a very little lime. Let it stand a couple of days; then stir up well. Let it settle again, and then use the clear liquid only, diluted at first with twice its bulk of water or more.

There are many other advantages to be gained by keeping poultry in combination with a garden, but I will not enter into them now. I will add, however, that if any of my readers who combine poultry keeping with gardening should have two plots of ground of about equal extent, one devoted to each section, they would do well to change the occupants annually, viz., put the poultry on, say, No. 1 plot one year, then next year have the garden on No. 1, and poultry on No. 2, and so on. By this method, the plots will receive a goodly amount of useful manure they would otherwise not get, and which would be wasted. It is advisable, however, when digging up the ground after poultry to put a little lime on it, so as to sweeten it.

SCIENCE NOTE.

Mimusops Elengi.

Mimusops Elengi, belonging to the family *Sapotaceae*, is a native of the East Indies. It is to be found growing in several of the West Indian Botanic Stations, where trees have been flowering for the first time during the last two or three years.

In Ceylon its hard and durable wood is much used for ordinary building purposes. Its fruits are edible. These are small, yellow, of an ovoid shape, with one or two seeds. From the seeds an oil can be obtained, which is used for cooking and for burning, while the flowers yield an essential oil from which a fragrant perfume is prepared. The bark is used medicinally, yielding a tonic and febrifuge.



FIG. 12. *MIMUSOPS ELENGI*.

[From *Kew Guide*.]

Fig. 12 shows a branch bearing flowers and fruits, also a single fruit about natural size.

Another tree of this genus, viz., *Mimusops globosa*, is a native of the West Indies, being better known as the balata tree. It grows to a much greater size than *Mimusops Elengi*, but, like it, produces edible fruits. It is also closely related to the sapodilla (*Achras Sapota*), the star apple (*Chrysophyllum Cainito*), and other well-known West Indian fruit trees.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice market for the month of March:—

In considering the constantly recurring statement as to the slackness of trade in the produce markets generally, it is a matter of no surprise that a certain amount of inactivity should prevail at the time of writing, when the accounts of the nation's expenditure for the past year, and the prospects of the coming twelve months, are on the eve of being presented to the taxpayers. Drugs and spices, however, are usually but little affected directly by budget considerations; though the principle of when one member of the commercial body suffers, all the members suffer more or less with it, is borne out in the world of trade.

GINGER.

At the auction on the 1st. of the month no Jamaica was offered but Cochin sold without reserve at the following prices: small and medium native-cut 31s. 6d. to 32s., a bolder form realizing 33s., while small medium fetched 26s. 6d. to 27s., and cut-tips 25s. Washed rough and brown Calicut was bought in at 21s., while 15s. per cwt. was paid for 20 bags of Japanese. A week later, ginger appeared at the sale, only in small supplies, 3 barrels of Jamaica being offered and sold at the following rates: small bright, 35s. 6d.; mouldy, 31s. 6d. Calicut was bought in at 18s., as was also new-crop, limed Japanese at the same price, while small and medium, rough Bengal was partly sold at 17s. On the 15th. of the month Jamaica again realized steady prices, 9 barrels of ordinary small being offered and disposed of at 35s., while some 700 bags of Cochin and Calicut were bought in at prices of from 28s. to 36s. In the following week a few bags only of ordinary common Jamaica were disposed of at 30s. 6d. to 31s. 6d. At this sale about 400 bags of Calicut were sold at the following rates: fine bold rough, slightly mouldy, 24s. to 24s. 6d.; fine brown rough 19s., unsorted native-cut was bought in at 37s. 6d., and fine bold Calicut at 35s. At the last sale on March 29, 80 barrels of Jamaica were sold, fair washed fetching 38s. 6d., good common 33s. 6d. to 36s., and common 30s. to 32s., while unsorted Cochin native-cut was bought in at 34s.

ARROWROOT.

At the spice auction on March 8, 454 barrels of fair to good manufacturing St. Vincent were offered and sold at 1½d. to 1¾d. per lb., 600 barrels being also disposed of privately at the latter rate. A week later from 70 to 80 tins of St. Vincent were sold at prices from 2¾d. to 3d. per lb., and again in the following week steady prices were obtained for 84 packages out of 290 offered.

PIMENTO, NUTMEGS, AND MACE.

The quotations for pimento at the auction on March 8 were 2¾d. to 2½d., at which rates 78 bags were sold. On the 22nd., as many as 900 bags were catalogued, and over 500 sold at from 2¼d. to 2¾d. per lb.

Nutmegs were in good demand at the first spice sale of the month, realizing from ½d. to 1d. per lb. over previous prices for medium sizes, and a similar decline for the larger sizes, from 80's; little or no change occurred in these prices throughout the month.

Mace was in steady demand with limited sales at prices from 1s. 3d. to 1s. 4d. per lb. for ordinary to fair West

Indian, and 1s. 2d. for red. At the last sale, on the 29th., better prices were obtained, fine pale West Indian being quoted at 1s. 8d., fair 1s. 4d. to 1s. 5d., red 1s. 2d. to 1s. 3d.

SARSAPARILLA, KOLA, ETC.

The month opened with an absence of grey Jamaica. Ten bales of Lima of barely fair quality fetched 11d. per lb., while 6d. to 7d. were the prices obtained for ordinary dull mixed pale-yellowish native. At the last auction 9 bales of grey Jamaica were offered, 2 bales of ordinary sound fetched 1s. 5d. per lb., and 7 bales of badly sea-damaged 1s. 2d. to 1s. 3d. per lb. Middling Lima-Jamaica, of which 13 bales were offered and sold, realized 10½d.; for 2 bales of sea-damaged native Jamaica 6½d. was obtained, and dull-red was bought in at 9d. to 9½d. per lb.

Of other West Indian products the following may be mentioned as appearing during the month:—At the first sale a small parcel of *Canella alba* bark, small to medium, palish quills sold at 35s., while good quill was held at 50s. per cwt. At the drug auction on the 16th., a case of hand-pressed West Indian oil of lime sold at 2s. 9d. per lb., and a case of fair distilled at 1s. 7d. In this connexion it was reported that a large business had been recently done in West Indian distilled oil at 1s. 6d. At the same sale, fair small West Indian kola was quoted at 5d. per lb., and for good bright Madras annatto seed 5½d. to 5¾d. was paid. Musk seeds which appear in the market only occasionally, were represented by 3 boxes from Ceylon of fair quality, which sold at 4d. per lb.

RAINFALL RETURNS.

St. Kitt's.

Mr. F. R. Shepherd has forwarded the following returns of the rainfall on six estates in St. Kitt's for the past five years (1900-4, inclusive). These estates represent the entire circle of the island, and the returns therefore give a fair average of the island's rainfall:—

Name of estate.	Rainfall in inches.					Average for five years.
	1900	1901	1902	1903	1904	
Canada ...	39·88	65·11	59·57	31·13	33·25	45·78
Molineux ...	59·69	104·04	116·85	74·01	74·19	85·75
Brotherson's ...	52·60	93·34	78·55	58·36	55·80	67·73
Con. Phipp's ...	47·60	82·27	67·33	40·22	46·79	56·84
West Farm ...	49·48	75·93	55·17	32·92	38·95	50·49
Douglas ...	40·05	76·90	65·60	38·75	38·60	51·98

Barbados Supple Jack. This is a climbing shrub, the stems of which were used as switches and riding whips. Formerly, it was no doubt, common; but at present it is confined to comparatively few localities. A specimen in fruit was received a few days ago from Miss Burton, of Staple Grove, Christ Church. This was loaded with dense clusters of bright-red capsules, and presented a very attractive appearance. We commend the Barbados supple jack (*Paullinia barbadensis*) as an interesting ornamental climber for verandahs and trellis work. It appears to be found nowhere else except at Barbados.

MARKET REPORTS.

London,—April 11, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 7, 1905; and 'THE PUBLIC LEDGER,' April 8, 1905.

ALOES—Barbados, 15/- to 45/-; Curacao, 15/- to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/6 to 1/7 per lb.
BEES' WAX—£7 10s. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 55/- to 60/- per cwt.; Grenada, 52/- to 54/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 2/- per lb.
COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—4/6 per bunch.
GRAPE FRUIT—12/- to 15/- per box.
ORANGES—8/- to 10/- per case.
PINE-APPLES—St. Michael's, boxes of 8, 2/- to 3/; boxes of 10, 1/4 to 2/3 per pine.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, middling to fair bright, 37/- to 39/-; common to good common, 33/- to 36/- per cwt.

HONEY—16/- to 25/6 per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 11½d. per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/5 to 1/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Pale West Indian, 1/4 to 1/6; red, 1/2 to 1/3; broken, 11½d. to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.

NUTMEGS—68's, 1s. 2d.; 81's, 11d.; 125's, 6d. per lb.

PIMENTO—2½d. to 2¾d. per lb.

RUM—Demerara, 1s. 3d. to 1s. 4½d. per proof gallon; Jamaica, 2s. per proof gallon.

SUGAR—Yellow crystals, 20/6 to 22/- per cwt.; Muscovado, 18/- to 19/- per cwt.; Molasses, 14/6 to 18/6 per cwt.

SULPHATE OF AMMONIA—£12 13s. 9d. per ton.

Montreal,—February 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 9c. to 9¼c. per lb.

GINGER—Jamaica, unbleached, 6½c. to 7½c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 28c. to 30c.; Antigua, 23c. to 25c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5¼c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey Crystals, 96°, \$3.65 to \$3.75 per 100 lb.

—Muscovados, 89°, \$2.90 to \$3.00 per 100 lb.

—Molasses, 89°, \$2.65 to \$3.75 per 100 lb.

—Barbados, 89°. No quotations.

New York,—April 14, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11¾c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.

COCOA-NUTS—No quotations.

COFFEE—Jamaicas, 8¼c. to 8½c. per lb. (ex store).

GINGER—Jamaica, 6½c. to 6¾c. per lb.

GOAT SKINS—Jamaicas, 58½c. to 60c. per lb.

GRAPE FRUIT—Jamaicas, \$3.50 to \$4.00 per barrel.

ORANGES—No quotations.

PIMENTO—4½c. per lb.

SUGAR—Centrifugals, 96°, 41½c.; Muscovados, 89°, 41½c.; Molasses, 89°, 41½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 19, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—27c. per gallon, package included.

SUGAR—No quotations.

Barbados,—April 22, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.50 to \$3.75 per 100 lb.

CACAO—Dominica, \$12.00 to \$12.50 per 100 lb.

COCOA-NUTS—No quotations.

COFFEE—\$10.50 to \$11.75 per 100 lb.

HAY—96c. to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—22c. per gallon.

ONIONS—Madeira, \$3.00 to \$4.00 per 100 lb.

POTATOS, ENGLISH—\$1.50 to \$1.80 per 160 lb. (retail).

RICE—Ballam, \$4.65 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR—Muscovados, 89°, \$2.00; Dark crystals, 96°, \$2.50 per 100 lb.

British Guiana,—April 20, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$7.50 to \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$5.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 14½c. per lb. (retail).

—Creole, 12c. to 14c. per lb.

DHAL—\$4.00 to \$4.25 per bag of 168 lb.

EDDOES—\$1.00 to \$1.20 per barrel.

MOLASSES—Vacuum Pan yellow, 17c. to 18c. per gallon (casks included).

ONIONS—Lisbon, 4½c.; Garlic, 5½c. per lb.

PEA NUTS—American, 5½c. to 5¾c. per lb. (retail).

PLANTAINS—16c. to 32c. per bunch.

POTATOS, ENGLISH—\$2.00 to \$2.40 per barrel.

RICE—Ballam, \$4.25 to \$4.30 per 177 lb.; Creole, \$3.90 per bag.

SWEET POTATOS—Barbados, \$1.32 per bag; \$1.32 per barrel.

TANNIAS—\$1.68 per barrel.

YAMS—White, \$1.80 per bag.

SUGAR—Dark crystals, \$3.20 to \$3.30; Yellow, \$4.00 to \$4.10; White, \$4.90 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—April 20, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$12.00 to \$12.25; estates, \$12.25 to \$13.00 per fanega (110 lb.); Venezuelan \$12.50 to \$13.00 per fanega

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9c. to 9¼c. per lb.

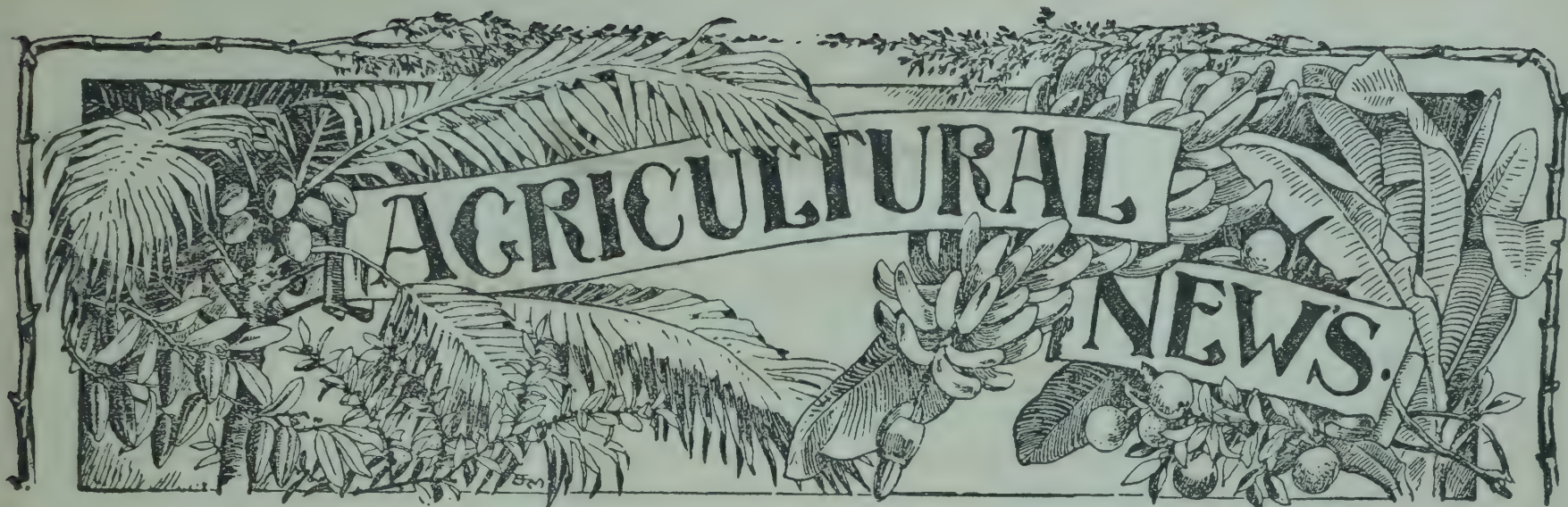
COPRA—\$2.90 to \$3.05 per 100 lb.

ONIONS—West Indian, \$2.25 to \$2.50 per 100 lb. (retail).

POTATOS, ENGLISH—80c. to 86c. per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; white \$4.75 to \$5.75 per bag.

SUGAR—White crystals, \$4.50; yellow crystals, \$3.50 to \$3.75; molasses sugars, \$2.75 to \$3.75 per 100 lb.



A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Cotton Oil Factory.

IN view of the progress made in connexion with the Sea Island cotton industry in the West Indies, it is proposed to erect a small plant at Barbados for the purpose of expressing and refining the oil to be obtained from the seed. This enterprise, we are glad to learn, is receiving the

support of the British Cotton-growing Association, and it is probable that the first Cotton Oil Factory to be established in these colonies will be ready to begin operations during the early part of next year.

The opinion has already been expressed in these pages that it is not desirable that the cotton seed produced in the West Indies should be exported to other countries, but that it should be retained, and either crushed for the purpose of being used as cattle food or disposed of to an oil factory on the spot, on condition that, after the oil is extracted, the seed cake is returned to the grower, or bought by him on advantageous terms for feeding purposes.

In the absence of an oil factory, the cotton seed is at present being fed to stock in the crude state or after it has been crushed in a disintegrator. In some cases, it is being buried fairly deep in the soil to serve as a manure. There is no doubt as to its value as a fertilizer, but it is more economical to feed it to stock, as in that case 80 per cent. of its manurial value is recovered in the dung.

An interesting article on the 'Fertilizing and feeding value of Sea Island cotton seed' is contained in the *West Indian Bulletin*, Vol. V, pp. 223-32. This will well repay perusal to those who desire fuller information on the subject. Sea Island cotton seed is stated to have a higher *fertilizing* value than Upland cotton seed. It is shown that 1,826 lb. of Sea Island cotton seed is equal in fertilizing value to 1 ton of Upland cotton seed. As regards *feeding* value, Sea

Island cotton seed "meal" (i.e. after the oil is extracted) is said to 'contain, on an average, in round numbers, in the air dry condition, 28 per cent. of protein, 8 per cent. of fat, 16 per cent. of fibre, 5 per cent. of ash, 33 per cent. of nitrogen-free extract.' It is added: 'We are impressed with the greater feeding value of Sea Island meal when we reflect that nearly 40 per cent. or two-fifths of the same consist of protein and fat.'

If 200 lb. of Sea Island cotton lint are obtained per acre, there would also be produced about 700 lb. of cotton seed. This, if shipped abroad, would realize, after payment of all expenses, about £4 to £4 10s. per ton. If, on the other hand, it is retained for extracting the oil and for feeding purposes on the spot, it is estimated that it will be worth about £6 to £7 per ton.

It is probable that the total crop of Sea Island cotton to be produced during the current season will be about 3,000 bales of 360 lb. each, or 1,080,000 lb. The weight of cotton seed will probably amount to 3,724,138 lb. or 1,663 tons. The yield of crude oil amounts to about 45 gallons per ton of seed, so that if all the seed were dealt with at an oil factory, the total output in crude oil would be 74,835 gallons.

A common arrangement in the cotton-ginning districts of the United States is for the oil mills to offer 1 ton of meal for 2 tons of seed, including freight both ways. It is claimed that this arrangement is profitable to both parties as the meal contains substantially all the fertilizing ingredients of the seed, and is in a form far more suitable for cattle food. For these reasons it would appear to be an arrangement which may be likely to suit the needs of the West Indian cotton planters.

As to the actual terms that will be offered by the Barbados Oil Factory, we are unable to state them at present. We understand, however, that the members of the Cotton Committee have been consulted in the matter, and they have expressed themselves as quite satisfied with them. As soon as the British Cotton-growing Association have approved of the scheme that has been submitted to them, it is hoped to enter more fully into details. In the meantime, the proposal to establish a cotton oil factory in these colonies is a gratifying proof of the confidence that is being felt in the future of the cotton industry. Such a factory will not only extend the value of the industry amongst members of the general community, but it will render cotton growing, by improving the health and condition of working cattle on estates, a valuable adjunct to the sugar industry in districts specially adapted for it.



SUGAR INDUSTRY.

Sugar-cane Experiments in Cuba.

The results of experiments with new varieties of canes at Central Soledad, Cuba, for 1903 and 1904 have already been published in the *Agricultural News* (Vol. II, p. 179, and Vol. III, p. 179). Through the kindness of Mr. Edwin F. Atkins, the proprietor, we are able to publish similar information for last season. The following is taken from a letter dated April 16, 1905:—

I now send you the analyses of canes made during the month of February, which may be of interest to you, as they contain several of your seedlings which you so kindly sent some time ago.

The samples were ground three times through our small experimental mill, and the figures of extraction are only valuable as comparative figures.

Of the various seedlings from your Department, the B. 208 and D. 95 promise very well, also the Caledonia Queen, and I have hopes that these will prove of value after we get them planted out in a congenial soil and get them thoroughly acclimated.

We are just finishing our crop here, which in quantity has been a disappointment, owing to the long drought which lasted from October until early in March, and I find our crop about 8 per cent. below the early estimates. The same has been the case all over the island, and Cuba this year will probably not turn out more than 1,100,000 tons of sugar against an early estimate of 1,400,000 tons.

	Weight of cane. lb.	Per cent. Juice.	Per cent.		Quotient of Purity.
			Solids.	Sucrose.	
B. 102 ...	5.13	61.0	19.7	15.0	76.1
B. 147 ...	3.25	76.9	20.7	18.1	87.4
B. 156 ...	3.25	61.5	19.9	15.9	79.9
B. 208 ...	5.50	50.0	23.3	21.8	93.6
B. 208 ...	3.00	66.7	21.7	20.1	92.6
B. 645 ...	5.00	70.0	19.6	15.5	79.1
B. 2,885 ...	5.75	69.6	17.4	14.8	85.1
B. 3,381 ...	3.75	60.0	22.0	19.5	88.7
B. W. Tr'spt. Caledonia	2.25	66.7	21.6	19.8	91.7
Queen ...	3.50	66.1	21.2	19.7	92.9
D. 95 ...	4.50	61.1	20.3	18.6	91.6
D. 95 ...	3.13	72.0	23.0	21.4	93.0
Sport, White	5.50	68.2	20.1	16.2	80.6
Tr'spt., White	5.25	52.4	21.8	20.3	93.0

It will be observed that B. 208 is practically the best cane on the list both in percentage of sucrose and purity of the juice.

Sugar-cane Experiments at Barbados.

The following is a memorandum drawn up by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., showing the scheme for sugar-cane experiments to be

carried out at Barbados during the crop period 1904-6:—

AREA AND NUMBER OF EXPERIMENTS.

The total area under experimental sugar-canes for this period is estimated at 81 acres, and there are in all 9,994 varieties of seedling canes and experimental plots under growth.

These experiments arrange themselves under the following heads:—

(1) The raising of improved varieties of sugar-cane from seed and by chemical selection of the cane plants.

(2) The improvement of the yield of present varieties by improvement in the methods of cultivation and manuring.

SEEDLING CANES.

These experiments are a continuation, with modifications, of the work carried on since 1899. It consists in raising large numbers of new varieties from seed and in subjecting each to a careful and systematic study in the field and laboratory.

This study divides itself into raising the varieties and studying them in successive stages of cultivation, during which the unfavourable varieties are eliminated and the favourable varieties are propagated in gradually increasing quantities, studying them first on an experimental and, finally, on an estate scale in the various districts of the island.

The first stage of seedling canes is now being grown for the first time this season with limited irrigation, and it is anticipated that the process of elimination and selection will thereby be greatly accelerated.

For the first time also the artificial cross-fertilization of known and highly favourable varieties of seedling canes has been successfully accomplished by direct pollination of emasculated flowers. It has only been possible in this first attempt (carried out in October to December 1904) to save four seedlings, but it is hoped that means will be found to carry out this process on a comparatively large scale in October 1905. In this way, both parents of each seedling will be known and will be selected with reference to their specially favourable characters.

During 1904, 8,000 seedlings were raised from seed and will be reaped and individually studied during the period under record. In the second stage 1,166 seedling varieties will be reaped and analysed; 497 varieties will be similarly studied in the third stage, and 221 plots of later stages of selected seedlings grown in plots in all the typical districts of the island will be reaped and analysed.

These seedlings are distributed over twelve estates and cover an area of about 40 acres.

CHEMICAL SELECTION.

There are two plots of chemical selection canes in 'Pear Tree' field at Waterford, where they are grown with irrigation, covering an acre of 15 acres. The canes will be reaped and a proportion individually analysed in continuation of the attempt to improve the richness of the cane by repeated replanting from the richest individuals.

MANURIAL EXPERIMENTS.

There are 111 small manurial plots of plant and ratoon canes covering an area of 15 acres, and twenty-four large manurial plots (1 acre each) covering an area of 24 acres. These are distributed over seven typical estates.

OTHER EXPERIMENTS.

A series of experiments in the germicidal treatment of cane plants will be reported upon during this period. The object of the experiment is to ascertain the effect of such

treatment, carried out with the object of preventing the access of fungoid diseases to the young plants, upon the proportion of 'seed-canes' that germinate and the condition of the resulting young plants.

SUMMARY OF PLOTS AND AREAS.

Smaller manurial plots	...	111	with area of 14.7 acres.
Large manurial plots	...	24	" " " 23.9 "
Selected seedlings, plants	...	135	" " " 9.2 "
do. do. ratoons	...	86	" " " 5.6 "
New seedlings, etc., plants	...	411	" " " 13.5 "
do. ratoons	...	86	" " " 4.3 "
Chemical selections	...	2	" " " 1.5 "
Seedlings of 1st. year	...	1,166	" " " 8.0 "
Seedlings in pots	...	8,000	(in pots)

Total	...	10,021	Total	...	79.35
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Enzymes in Sugar-cane.

The following review of an article by C. A. Browne in *Science*, on 'The formation of toxic products by vegetable enzymes,' is taken from the *Experiment Station Record*:—

In the course of experiments with sugar-cane the author reports having frequently observed that cane which had been sterilized by steaming suffered a more rapid deterioration through attacks of molds and bacteria than raw cane. Further it has been observed that juice from the upper green portion of the living cane is more resistant to fermentation than juice from the riper joints further down. The juice from the top of the cane undergoes a rapid darkening after pressing, while that from the middle and bottom exhibits such a change to a much less degree, and the juice from steamed cane exhibits no change in coloration whatever.

The change in colour is attributed to the action of the oxidizing enzymes, and that such bodies do occur in the sugar-cane is readily shown. From the association of the coloration phenomena with resistance to fermentation, it is concluded that the dark-coloured oxidation products produced by enzymes may have a toxic or germicidal action. That they do possess this characteristic is shown by experiments which are described at some length.

CARRIACOU.

A Cottagers' Show.

According to the *Grenada Chronicle*, Mr. Whitfield Smith, the Commissioner of Carriacou, is organizing a Cottagers' Show to be held in November next. It is stated:—

This move is deserving of all the support and encouragement possible. We learn from a notice which is being circulated in Carriacou that at the proposed show the Government will offer money prizes for the best exhibits of stock, vegetables, and fruit, and products manufactured in the island, the prizes being intended only for the holders of not more than 10 acres of land. His Excellency the Governor has expressed his intention to be present to open the show and distribute the prizes. We are informed that great interest is being shown by the people of Carriacou in this movement, and the occasion already promises to be an unqualified success.



WEST INDIAN FRUIT.

BANANAS IN GREAT BRITAIN.

The United States Consul in Liverpool reports as follows on the increasing trade in bananas in the United Kingdom:—

Attention has been drawn several times in these reports to the growing taste of the British people for bananas. A few years ago they were almost unknown in this market, but now they are about as plentiful and cheap as in the United States. This is a fact in which Liverpool takes much pride, as the trade is owing altogether to the enterprise of a Liverpool shipper, and the trade is still distinctly a Liverpool one. Last year the total value of the banana importations was \$5,984,445. The Canary Islands have by far the biggest part of this trade, the value of last year's shipments being \$4,544,570. Great endeavours have been made to increase the sale of Jamaica bananas, but the amount imported is only one-sixth that of the fruit from the Canaries. The latter fruit is smaller than the Jamaican banana, but the flavour is much finer and the bananas get here in better condition.

BLUEFIELDS BANANAS.

The Board of Commissioners of Agriculture of Hawaii has been engaged in introducing the 'Bluefields' banana into Hawaii. The following description of this banana is given in a recent report:—

The Bluefields banana, so called by reason of Bluefields being the principal port from which this particular kind of banana was first shipped to the United States, has superseded almost every other kind of banana consumed in the United States, except the China variety produced in Hawaii and consumed on the Pacific Coast. It is not quite so delicately flavoured as the China or the Jamaica red banana, but it possesses several other qualities which make it by far the best shipping banana that there is, viz. :—

(1) The China banana has a delicate skin, easily bruised, and turns black when bruised. It therefore has to be wrapped in a thick sheathing of leaves and grass, adding greatly to the expense of handling, and nearly doubling the space occupied. The Bluefields banana has a tough skin, not easily bruised and which does not easily discolour. Consequently it does not have to be wrapped.

(2) The China banana ripens quickly, becomes spotted and softens at the stem and drops off the bunch, within a few days after it is ripe. The Bluefields ripens slowly, maintains a clear golden-yellow colour, and merely dries at the stem, so that it will last a week or more longer than the China under like conditions.

(3) The China banana projects at right angles from the bunch. The Bluefields slopes upward and backward, along the stem, packing closer and being less liable to injury than the China.

The U.S. Department of Agriculture despatched a special agent to secure plants, and 325 banana stumps were received in January 1904. Of these 110 survived and grew. These have been propagated at the station producing 275 shoots; 130 of these have been sent to Hilo, and are being used to propagate suckers.

SHIPPING ORANGES.

The following is an extract from a letter (published in the *Jamaica Gazette*), addressed by a gentleman in Chicago interested in the fruit trade, to his Excellency the Governor of Jamaica. The letter was considered by the Board of Agriculture, but the Board, whilst fully aware of the danger that threatened the orange industry through careless packing and the shipment of immature fruit, was unable to suggest any practical remedy to check the evil. As the Board pointed out, this is a matter which rests largely with the shippers themselves:—

I have noticed that oranges and grape fruit consigned to the different English and American markets during the season just closed have, in many cases, been very poorly packed and graded, much to the detriment of the fruit that is well put up and graded by responsible Jamaica companies. It seems to the writer that this fault can be greatly remedied at the Jamaica end of the line by a proper system of inspection, under the control of the Government, which system, if properly and continuously followed up, would create a much larger demand for the beautiful, sweet, thin-skinned Jamaica orange, and also much better prices.

You have a very fine orange and should be able to market more of the fruit, and it can be done profitably if certain necessary conditions are followed in the packing and grading of the same.

The consumer demands certain qualifications and expects them. If he cannot get them from the Jamaicans, he goes for his fruits either to the Californians, Floridians, Mexicans, or Mediterraneans.

This important subject is dealt with, also, on p. 153, where the views of Mr. Stockley of Elders Fyffes, Ltd., are noted. The progress of the orange industry is certainly being retarded by the export of unselected and carelessly packed fruit.



THE FISHERIES OF ANTIGUA.

The following report of a sub-committee appointed last year by the Antigua Agricultural and Commercial Society to investigate the subject of the fisheries of that island has been communicated by the Government to the Imperial Commissioner of Agriculture:—

A large quantity of immature fish is caught by seines, which is not returned to the sea. Therefore, a law should be passed, compelling the meshes of all seines to be of a standard size, as is done in Jamaica. We recommend the Jamaica Act as a model to be followed.

In other British colonies, a close season for most fish has been established, and such a law has been in force here with regard to turtle until lately; but owing to the want of co-operation on the part of the neighbouring islands, belonging to foreign powers, it has had to be abandoned. As the fisheries are practically undeveloped, we do not think a close season for fishing is, at present, necessary, but it may be a subject for future consideration. It is interesting to note the opinion of local fishermen that they do not catch fish so readily in fish-pots since the eruptions in Martinique, as they did before; but we cannot find any evidence to this effect.

The bulk of the fishermen in Antigua are incompetent, and ignorant of proper methods of catching fish, and need instruction by literature and other recognized means. This instruction might be provided by the Imperial Department of Agriculture, aided by the efforts of the local Agricultural Society. In this connexion we suggest that models of modern appliances for catching fish, such as pots, trawls, etc., be obtained and exhibited through the fishing villages of Antigua. The value of fish as a cheap and nutritious food for the labouring classes, leading to a healthy and numerous population, is well known.

At present the tree oyster industry of Antigua is entirely neglected. Possibilities exist of developing this industry by exporting oysters in ice, or cool chambers to neighbouring colonies. There is also complete ignorance as to the care and propagation of this shell fish, which is a staple article of diet among the people in the villages.

The Imperial Department of Agriculture has already obtained some information as to the feasibility of establishing a pearl fishery in the more suitable harbours of Antigua on the lines of the prosperous fishery at the island of Margarita off the coast of Venezuela. It is probable that in course of time, a similar industry might be developed here, and we suggest that the Agricultural Society should ask the Imperial Department of Agriculture and the local Government to take the necessary steps to assist in the establishment of such an industry.

The sponge industry of Antigua is absolutely untouched, and the possibilities are great, as sponges are very plentiful around the coral beds, but nothing is known of the art of curing them for market.

The sea-egg industry of Barbados is the mainstay of the labouring population there; the same sea-eggs are to be found around these shores, but, through ignorance of their value, this branch of fishery is quite neglected. It should be noted that the roe of the sea-egg is a most nutritious food.

The fish-oil and fish-manure industries are possible developments of a plentiful supply of fish. Properly cured shark skins and shark oil are also in demand in the English market, but nothing is known as to their preparation, though sharks abound here.

It is evident from the above that the fishing industry of Antigua contains possibilities of great wealth, and could give employment to a much larger population than at present. Ignorance, want of co-operation, and the absence of a profitable market have been the chief causes of its non-development. We venture to think that a small local company, with £1 shares, might be formed to make a practical beginning of its development on the lines of the Grimsby Fishing Company in England. A proper scheme of co-operation so as to market the fish rapidly and market what is not required will be the foundation of any future success in this industry.

AGRICULTURAL ORGANIZATION IN HAWAII.

The first report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii has recently been issued. It covers the period from July 1, 1903, to December 31, 1904.

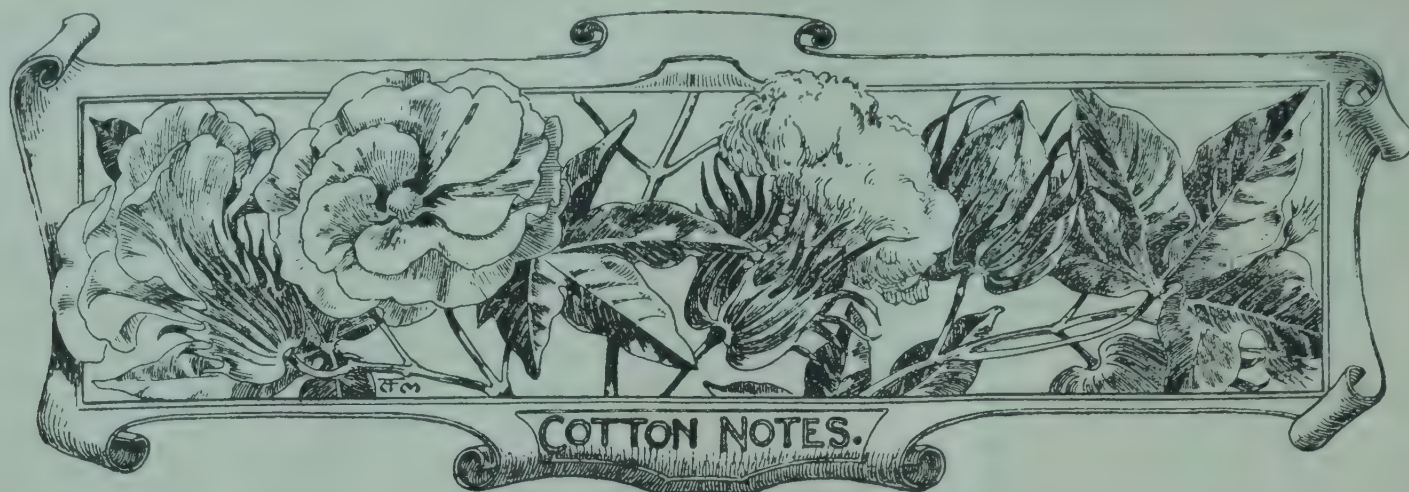
Besides its general object the Board has charge of matters appertaining to forestry, entomology, and agriculture. The Board maintains relations with the National Bureau of Forestry at Washington, the Federal Agricultural Experiment Station at Honolulu, and the Hawaiian Sugar Planters' Association. The latter organization, although it has established an elaborate entomological station of its own, still pays half the salary of two of the three entomologists in the employ of the Board. The Federal Experiment Station is practically conducting the work of the agricultural division of the Board. On the recommendation of the Board proclamations have been issued prohibiting the importation of cacao seeds or plants, banana fruits or plants, and other fresh fruit from certain specified countries; the importation of sugar-cane, except for experimental work, is absolutely prohibited.

Mr. R. S. Hosmer has been appointed Superintendent of Forestry, and is assisted by a large number of District Foresters, serving without salary in the various islands of the group. The work of the forestry division is in connexion with the establishment and care of forest reserve, reforestation, etc.

The work of the entomological division has been mainly (1) the inspection and quarantine, disinfection or destruction wherever necessary, of fruit and plants entering the colony, with a view to preventing the introduction of new insect pests; (2) seeking and disseminating parasites of the leaf-hopper. This work is now carried on by the Sugar Planters' Association. (3) The introduction of insect enemies of other destructive insect pests. Reports from the entomological staff are included in the Report of the Board.

The two lines of work of the agricultural division, it is said, which promise the most immediate beneficial results, are in connexion with the introduction of a new variety of banana—the Bluefields banana*—and the production of a marketable tobacco. Work is also being carried on in connexion with the mango, avocado pear, citrus fruits, cacao, rubber, etc. The experiment station of the Sugar Planters' Association deals with the whole of the work in connexion with sugar-cane.

* A description of this banana will be found elsewhere in this issue. [Ed. A. N.]



Sea Island Cotton Industry.

A correspondent writes:—

What is the object of our present efforts in regard to cotton growing in the West Indies? As well expressed by a Consul-General of the United States, it is 'to produce a high quality of fibre for a special class of the British textile trade.'

If we are proposing to grow cotton irrespective of quality, that is cotton of the ordinary Upland sorts, fetching 4d. to 6d. per lb., then it is not worth our while to take further trouble in the matter. Other countries are in a position to grow such cotton cheaper than we can, and it would pay us better to turn our attention to other crops.

If, however, we realize that our aim is to grow the best class of Sea Island cotton, fetching 15d. to 17d. per lb. (which these colonies have conclusively shown they can produce), then the prospects of the industry are as good as any in the West Indies. We have special advantages in our soil and maritime climate and can produce Sea Island cotton that is better than anything grown elsewhere. What is necessary is:—

(1) To obtain the best seed; this should be selected and disinfected beforehand, and planted in June, July, or August, according to the rains. Any one who plants seed of inferior quality stands to lose 4d. to 6d. on every pound of cotton he produces.

(2) To select good land and have it well cultivated and manured; good cotton in large quantity cannot be grown on poor unmanured soils; pen manure in moderate quantity in addition to the artificial manures suggested on pp. 57-8 of 'A.B.C. of Cotton Planting' have given excellent results; the cost would be at the rate of about \$8 per acre.

(3) To keep a keen look-out for the cotton worm and other pests; the moment these appear every cotton planter should be ready to apply the necessary remedies; they are simple and effective; weeders and others should be encouraged to watch and report the first appearance of the cotton worm.

(4) To have the cotton regularly and carefully picked as soon as the buds are fully open, and sent clean and dry to the ginning factory; great improvement is reported in the quality of the West Indian cotton shipped this year, showing that the planters have fully realized the importance of clean picking and rejecting all immature and stained cotton.

(5) To complete the first and second pickings (according to the locality) by the end of February,

March, April, or May, and then uproot everything so as to allow no old and diseased plants to be carried over into the following season.

(6) To avoid ratooning Sea Island cotton under any circumstances; to ratoon Sea Island cotton (as stated by Mr. Wolstenholme) 'will spell ruin to the industry.'

Cost of Ginning, Baling, and Shipping.

Mr. J. R. Bovell, F.L.S., F.C.S., Agricultural Superintendent at Barbados, has forwarded the following statement showing the expenses incurred in ginning, baling, and shipping a pound of Sea Island cotton. The statement is prepared from the returns obtained from the 40 bales (containing 13,947 lb. of lint) shipped by the R.M.S. 'Tagus' on February 25 last. The ginning and baling have been charged at 1½c. per lb.:—

Expenses at Barbados:—			Cents.
Ginning, baling, etc.	...	...	1·500
Marine insurance at £18 per bale	...	...	·139
Cartage at 1½d. per bale	...	...	·009
Lighterage at 5d. per bale	...	...	·029
Expenses in England:—			1·677
Discount, at 1½ per cent.	...	...	·480
Dues	...	...	·014
Quay portorage	...	...	·017
Freight at 17s. 6d. per ton measurement	...	...	1·313
Attending ship, cartage, housing, mending, stowing, delivery, etc.	...	...	·103
Warehouse rent	...	...	·009
Fire insurance	...	...	·022
Interest and bank commission on freight, etc.	...	...	·007
Brokerage at 1 per cent.	...	...	·320
Total expenses			3·962

The total expenses, it will be seen, are 3·962c. per lb. or, say in round numbers, 4c. or 2d. per lb.

Selecting the best Seed.

As showing that the importance of selecting the best cotton seed for planting purposes is fully recognized in the cotton districts of the United States, we extract the following from the *Report* of Messrs. W. W. Gordon, dated Savannah, April 28, 1905:—

Sea Island planters cannot be too careful in the seed they plant. In some sections, where cotton of excellent

staple was produced a few years ago, neglect to replenish with fresh seed has resulted in cotton of weak and irregular staple, which has been almost unsaleable.

Deteriorated seed cannot produce strong staple. In view of the above facts, and the further fact that strong-staple Sea Island cotton is superior to any other kind of cotton and will always be saleable, whereas weak-staple Sea Islands are not so valuable and can be replaced by other cottons, the necessity for using the best seed must be apparent to every one.

Selecting and Disinfecting Seed.

Mr. W. N. Sands, the Agricultural Superintendent at St. Vincent, reports as follows on the progress of the work in connexion with selecting and disinfecting cotton seed :—

The quantity so far received and selected for local growers totals 10,166 lb., about 4,000 lb. of which have been treated with corrosive sublimate and carbon bisulphide and delivered to the owners.

For export I have purchased, so far, 2,500 lb. of unselected seed, and the work of selection is being proceeded with. At the factory I have between thirty and forty women employed under strict supervision, and they are being paid at the rate of 40c. per 100 lb. of selected seed. I find that a woman working well can select about 30 lb. per day, but the average would be much less.

So far, showery weather has retarded the operation of disinfection, but in fine weather we can treat upwards of 1,000 lb. of seed daily.

Cotton Exports from the West Indies.

The following is a statement (furnished by the Customs Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West Indian Colonies during the quarter ended March 31, 1905 :—

Colony.	Bales.	Weight in lb.	Estimated value.
Barbados ...	408	139,157	£6,957 17 0
St. Vincent ...	149	51,209	2,560 0 0
Nevis ...	236	47,008	2,350 0 0
St. Kitt's ...	146	47,633	2,382 0 0
Montserrat ...	131 ¹	65,789	3,239 16 0
Anguilla ...	86	17,200	860 0 0
Antigua ...	73	13,140	657 0 0
Virgin Islands ...	6	1,200	50 0 0
Grenada			
(Marie Galante)...	100	30,100	357 15 0
British Guiana			
(Unknown) ...	2	1,027	26 15 4
St. Lucia			
(Unknown) ...	32 ²	785	12 18 8
Total ...	1,369 ³	414,248	£19,454 2 0

¹ including 1 bag ; ² bags ; ³ including 33 bags.

In reference to the estimated values of the cotton exported from the several colonies given above, it should be pointed out that the cotton has been valued for statistical purposes at 1s. per lb., whereas a large proportion of that shipped from St. Vincent has been sold at 17d., and similarly cotton from Barbados has fetched 16½d. per lb.

Rivers' Sea Island Seed.

The experiments undertaken to ascertain the effect on the lint, if any, of the fuzziness of some of the seed obtained last year by the Imperial Department of Agriculture from South Carolina, were fully described on pp. 106-7 of this volume of the *Agricultural News*.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture by Mr. E. Lomas Oliver. Mr. Oliver, it may be mentioned, has recently examined samples of ginned and unginned cotton grown from the fuzzy seeds in Antigua and Barbados :—

These cottons are manifestly pure Sea Island and equal to the other cotton grown in these islands. There is not the faintest trace of anything of an Upland character. If any one, not having any knowledge of pulling cotton, doubts this report, you can convince him by showing him the cotton in the seed. You will yourself, no doubt, have observed that the seeds in the seed-cotton grown from fuzzy seed are not fuzzy. If the fuzzy seeds were of Upland origin the seeds would be fuzzy, but they are not. To my mind this settles the matter once and for all that the seed you obtained last year was *pure Sea Island* seed, and should give confidence in your Department's seed for the coming season.

RAINFALL RETURNS.

Leeward Islands.

The following information in regard to rainfall is taken from the *Annual Report* on the Leeward Islands for 1903-4 :—

The average rainfall on sixty-eight stations in Antigua was 43·68 inches, as against 58·80 in the previous year. The rainfall was 2·65 inches below the average rainfall for the past thirty years.

No returns of the rainfall in St. Kitt's have been furnished this year.* The United States Weather Bureau, from which source this information was obtained last year, only kept its office open from July 9, to November 15, 1903, viz., during the hurricane season.

In Dominica the rainfall is abundant ; at two stations, Melville Hall and Morne Park, the rainfall recorded was 251·56 inches in each case.

In Montserrat, the greatest rainfall was recorded at Olveston Botanic Station, where the rainfall measured 70·57 inches.

Atmospheric Nitrogen. It has been computed by scientists that there exist over every acre of the surface of the globe 70,000,000 lb. of nitrogen in a free state, which, it may be interesting to note, is worth at to-day's cost of this constituent in nitrate of soda about £360,000 per acre. It has long been the dream of scientists to extract a supply of this valuable material from the atmosphere. It is there in abundance, to be had free, without money, and without price, just for the taking, but the problem is how to take it. This problem seems, however, at last to have been solved. (*Agricultural World*.)

* Returns of the rainfall on six estates in St. Kitt's were published in the last issue of the *Agricultural News* (p. 143). [Ed. A.N.]

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

VOL. IV. SATURDAY, MAY 20, 1905. No. 81.

NOTES AND COMMENTS.

Contents of Present Issue.

It is proposed shortly to erect a Cotton oil factory at Barbados. The benefits likely to accrue from this are discussed in the editorial.

Interesting notes in connexion with the sugar industry will be found on pp. 146-7: these include a statement of the results of experiments in Cuba with seedling canes from Barbados and Demerara, and also a report on experiments at Barbados.

On p. 149 is published a report on the fisheries of Antigua, in which various suggestions for the improvement of the fishing industry are made. The need for instruction as to proper methods is urged.

Important information in regard to cotton will be found on pp. 150-1. The special requirements, in order to make the industry a complete success, are clearly set forth for the benefit of all growers. It will be seen that the estimated value of the exports of cotton from the West Indies during the quarter ended March 31 last was nearly £20,000.

The statement published on p. 157, with reference to pig rearing in Trinidad, shows that pigs can be kept very profitably in the West Indies when advantage is taken of local-grown food.

A special article on 'Agricultural Efforts at Grenada' appears on p. 158. Elsewhere in this issue reference is made to the appointment of a Superintendent of Agriculture, and to the vacancy for an Agricultural Instructor.

Onion Seed for 1905.

With reference to the note that appeared on this subject in the *Agricultural News* (Vol. IV, p. 56) orders have been received for supplies of seed from Tenerife amounting in all to 446 lb. This is sufficient for planting about 100 acres. The largest quantity of seed has been ordered for Antigua (225½ lb.); Montserrat comes next with 96 lb.; then Barbados and the Windward Islands, 70½ lb.; St. Kitt's-Nevis, 25 lb.; and Trinidad and Tobago, 15 lb. It will soon be time for the land to be selected and carefully prepared and for the seed beds (which should be close to a good supply of water) to be ready for planting. The seed should arrive not later than the beginning of August next.

Seed of English Potatoes.

In order to continue the experiments started some years ago in growing English potatoes in the West Indies, the Imperial Department of Agriculture is making arrangements to import seed-potatoes of the 'Bliss Triumph' variety for planting early in September next. The potatoes would then have time to grow before the setting in of the dry season and they would be the first new potatoes to come into the market in New York or London. There is also a fair local demand for new English potatoes.

Those who are desirous of obtaining seed-potatoes for delivery in September next are requested to communicate as early as possible with the local officers of the Department.

The cost of the seed-potatoes (which are quite distinct from ordinary potatoes and command a higher price) will range from \$3 to \$4 per barrel according to the market value at the time of shipment.

Exports of Dominica.

An official statement of the exports of Dominica during the year 1904 shows that the most valuable product of the island is cacao, the exports of which amounted to 9,880 cwt., of the value of £21,325. The total value of the lime products was £28,986, made up as follows: concentrated lime juice (83,727 gallons), £17,792; raw lime juice (234,972 gallons), £6,853; fresh limes, £2,857; lime oil, £1,160; pickled limes, £324.

Other fruit exports were: bananas, £189; coconuts, £452; mangos, £218; oranges, £615; pine-apples, £25. There were also exported small quantities of tamarinds, orange oil, *Cassia Fistula*, divi-divi, etc.

Reference might also be made to the export of bay leaves and bay oil. Of the former 246 bales were exported, having a value of £1,107, while 24 gallons of bay oil, valued at £60, were also exported. Whale oil (in transit) was shipped to the extent of 63,474 gallons, worth £5,290.

Refined sulphur also appears on the list of exports, the shipments during 1904 amounting to 47 tons of the value of £207. Large quantities of wood were also shipped.

Packing of Oranges.

A representative of the Jamaica *Gleaner* recently had an interview with Mr. A. H. Stockley, of Elders & Fyffes, Ltd., in regard to the fruit business. Referring to the record banana shipment by the 'Port Kingston,' Mr. Stockley remarked that the trade had developed wonderfully in the short space of four years, and he thought Jamaica was to be congratulated upon so valuable an addition to their export trade.

The export of citrus fruits had also increased to a considerable extent, but Mr. Stockley regretted that there had been but little improvement in the packing. The majority of shippers did not seem to realize the importance of packing their fruit in such a manner that it would arrive in marketable condition: these people were doing incalculable harm to the industry.

He had no doubt that if the growers in Jamaica would select their fruit and pack it carefully, they would find a splendid market.

Agriculture in Cuba.

The U. S. *Monthly Consular Reports* for January 1905 contain a lengthy and interesting report on the industries of Cuba in 1904. The principal crop of the island is sugar, of which the production was 60,817 tons in excess of that for 1903. The production of molasses during the first six months of the year, amounted to 42,200,000 gallons.

The tobacco crop was good both in quantity and in quality. The pine-apples obtained better prices owing to large shipments being now made direct to Chicago, instead of all being placed on the New York market as heretofore. A decided increase in the shipment of other fruits is noted in 1904. The Cuban orange is said to be delicious, and limes and lemons of good quality and abundant.

The value of the exports of lumber, dye-woods, honey, and bees'-wax is constantly increasing. The cattle industry, at one time one of the principal ones of Cuba, is fast regaining its former prominence.

Exports of the Republic of Honduras.

From the annual *Consular Report* on this republic for the year ended June 30, 1904, it is noticeable that the banana trade is rapidly extending, the exports for the year under review being of the value of £188,763, as against £121,443 for the previous twelve months. The cultivation of bananas appears to be the principal agricultural industry. 'Except for the strip on the northern coast, which produces ever increasing quantities of bananas, and a fair number of cocoa-nuts, the agricultural districts increase their production very gradually.'

Other products of vegetable origin, exported to any extent, are cocoa-nuts, mahogany and cedar, sarsaparilla, rubber, and coffee.

The exports of rubber increase slowly, but it is expected that this should be an important industry in the future. There is plenty of suitable land within easy reach of the coast. Sarsaparilla is also exported in increasing quantities.

Agricultural Banks for Cyprus.

Attempts are being made to introduce agricultural banks into Cyprus. A pamphlet recently issued gives an account of the Raiffeisen system, pointing out how it might be adapted to the condition in Cyprus. This system has been fully described in pamphlet No. 35 of the Imperial Department of Agriculture.

After reviewing the conditions prevailing in other countries where the Raiffeisen banking system has been introduced and successfully worked, it is shown that, at least, as promising a field is offered by Cyprus. Against the proposal it is argued that the peasants are so ignorant, so suspicious of one another, so unthrifty by nature and habit, and, further, so unenlightened in business habits, and so incapable of realizing the advantages of a credit system, that any attempt to introduce it would be foredoomed to failure. These arguments, however, fail to recognize the fact that the Raiffeisen system has, in other countries, been the cause of the removal of those very evils.

There do not appear to be any insuperable obstacles in the way of establishing agricultural banks in Cyprus. What is needed is that the methods should be made known and well understood: for this it is necessary to organize. Then trials should be made on a small scale in one or two small villages.

Varieties of Cacao in Ceylon.

In *Circular* No. 24 of the Royal Botanic Gardens, Ceylon, Mr. R. H. Lock gives an account of the varieties of cacao existing in Ceylon. The oldest cacao trees in the Gardens belong to the 'old red' variety, known as Criollo, Creole, and Caracas cacao. Previous to the introduction of Forastero cacao, in 1878, it appears to have been the only form known in the island. Though formerly much grown in Trinidad, it is now a comparatively rare kind in the West Indies. The trees of this variety are of a smaller and weaker habit than those of the Forastero kinds.

Considerable attention is being paid to another Criollo variety 'Cacao del Pays' of Nicaragua. Its most characteristic feature is the very large size of the seeds, which excel, in this respect, those of all other varieties. The cured seeds are about twice the weight of those of either the Old Red or the Forastero varieties. 'There is every indication that on a good soil and with careful cultivation this variety of cacao will prove most valuable. In its natural country it has the reputation of producing the highest quality of cacao of all known kinds. It is fairly prolific, and the very large beans should command high prices.'

The term Forastero is used to include all varieties other than Criollo. It includes varieties of high quality with pale-coloured, well-rounded beans, on the one hand, and on the other, beans of poor quality, flat, deep-purple in colour, and bitter in taste.

Efforts should be made to keep varieties separate to avoid the mixed plantations now common. The actual variety to be grown must depend, to some extent, on soil and situation. Whatever variety is chosen, it is important to select specially strong, healthy trees as parents, and such as are known to yield a good crop.



INSECT NOTES.

Lice on Hogs.

A correspondent in Barbados has sent to the Head Office of the Imperial Department of Agriculture specimens of insects found on hogs, with the information that they are very numerous and the hogs suffering considerably from the attack.

Examination of the specimens shows this insect to be the hog louse (*Haematopinus urius*). It is quite distinct from the ticks, being a true insect of the natural order Hemiptera, and related to the true bugs, plant lice (aphides), scale insects, etc.

The hog louse like other true lice, has sucking mouth parts and lives upon the blood of its host. This insect has been known for a long time and in many countries. When its attack is very severe the pigs lose flesh and appear thin and unhealthy.

The remedies recommended are contact insecticides such as, tobacco water, dilute carbolic acid, kerosene emulsion, etc., used as washes or sprays. Fine dust, powdered charcoal, or ashes applied to the necks and backs of the animals, or, better, put where they can roll in them, are very useful and will generally serve to keep the lice in check. Cleanliness in the pens and sheds, also, will be a great aid in keeping the hogs free from this insect.

Hercules Beetle and the Twig Girdler.

Much popular interest is usually attached to the larger forms of insect life and to those forms that from their bright colour, or the peculiar modifications of their appendages, are out of the ordinary. One of the somewhat extraordinary insects of the tropics, both from its great size and its peculiar structure, is the Hercules beetle (*Dynastes hercules*) common at Dominica. This beetle has an average total length of about 7 inches, with a range from $4\frac{1}{2}$ to $9\frac{3}{4}$ inches. From the top of the thorax a long horn projects forward curving slightly downward, while from the front of the head a shorter horn, curving upward, reaches to about its middle. It has long been a popular tradition that the hercules beetle clasped these horns on a small twig and then, by means of its wings, whirled round and round till the twig was cut off. In the *Agricultural News* (Vol. II, p. 264) this tradition was mentioned, and the statement made that entomologists had long known that it was impossible for the hercules beetle to cut off twigs in this manner. It was further stated that specimens of the beetle were at hand which *does* cut off the twigs of certain trees. This insect has recently been identified as *Oncideres amputator*. The members of this genus are all twig girdlers. The female beetle lays an egg in the bark of the twig, and then with her strong mandibles gnaws it round and round until only a little wood is left in the centre. The wind breaks off the twig at this place and the egg is carried to the ground when it falls. The larva hatching from the egg feeds on the substance of the twig as it decays.

In this way the twigs of the 'pois doux' and 'saronetta'

are cut off by the twig girdler, but not by the hercules beetle.

It might be mentioned that a new species of *Dynastes* (*Dynastes vulcan*) has recently been named and described by Mr. A. H. Verrill, of Dominica. This is somewhat similar in appearance to the hercules beetle, but is smaller, about 4 inches in length, and the shape of the horns is quite different.

Entomology at the Cape of Good Hope.

The report of the Government Entomologist of the Cape of Good Hope for the first half of 1904 gives a review of the entomological work for that period and outlines a plan for future efforts. The work on the relation of ticks to diseases of animals is being carried on, and results are given of experiments with African Coast fever of cattle and the Brown tick and with heartwater and the ordinary Blue tick. With regard to this latter, it has been proved that cattle and Persian sheep are subject to the disease, while horses are not, and that the Persian sheep have it in a mild form only.

The Assistant Entomologist (now Eastern Province Entomologist) contributes a paper on 'Insects affecting Mealies' (*Zea Mays*) the principal of which is the stalk borer (*Sesamia fusca*). The chief remedy recommended is the clearing of the fields of stalks at once after the harvest and ensilaging or shredding the stalks, to kill the hibernating larvae.

Insects affecting fruit also receive attention. The chief of these is the Fruit Fly. This is the insect, the parasites of which have been found in Brazil and have been taken to Australia. As was mentioned in the *Agricultural News*, Vol. IV, p. 124, the Government Entomologists of the Cape of Good Hope and Natal had started on a visit to Brazil for the purpose of procuring some of these valuable insects for their respective colonies.

The report concludes with a proclamation and schedule regulating the importation of plants into Cape Colony.

SISAL HEMP FROM THE CAICOS ISLANDS.

The Imperial Commissioner of Agriculture recently forwarded to Messrs. Ide & Christie, the well-known fibre brokers of Mark Lane, London, a sample of sisal fibre from the Caicos Islands with the request to be favoured with an opinion as to the quality and value of this fibre as compared with similar fibre from Yucatan and the Bahamas. The fibre had been sent by the Commissioner of the Turks Islands, who wrote: 'It is from the East Caicos Co.'s plantation and is cut from plants only *twenty-two months* old. I think it would be hard to beat the fibre anywhere at the age; it is strong, of good length, and bright in colour.'

The report, dated April 25, 1905, received by the Imperial Commissioner of Agriculture from Messrs. Ide & Christie, is as follows:—

Your favour of 4th. inst. and sample of Caicos Islands sisal hemp duly to hand. Shipments from time to time have come to London and sold fairly well. We find the type of good preparation but the length somewhat shortish, and the colour yellow; we have seen better and worse from these parts, as also the Bahamas; compared, however, with the Mexican, excepting in the length, we consider the East Caicos Co.'s production superior, and we value such here to-day £34 per ton.

EDUCATIONAL.

Educational Systems in the West Indies.

There has recently been issued by the Board of Education volume 12 of the 'Special Reports on Educational Subjects, including Reports on the Training of Native Races' (Cd. 2377), which deals with the educational systems in the West Indies, Central America, St. Helena, and Gibraltar. The history of education in each colony or possession is given, together with a description of the present state of education, and copies of various legislative enactments and syllabuses of study. It should be mentioned that the majority of these reports were written some three years ago. So far as agricultural education is concerned, therefore, they scarcely indicate the present position of affairs. It is well recognized that considerable progress has been made in this direction in the West Indies since 1902.

In Trinidad agriculture has been added to the subjects of instruction in the elementary schools, and school gardens are becoming the general rule. In Grenada the Imperial Department of Agriculture for the West Indies has practically taken the burden of agricultural education on its shoulders; and under its guidance and direction, the necessary steps for qualifying teachers to teach the subject, for securing proper school plots contiguous to, or in the neighbourhood of, the schools, have been taken, the Department lending its Botanic Station for the work of practical demonstration at all stages of teaching, and offering the services of its Curator. The teaching of agriculture is provided for pupils in the higher standards. The teaching of this subject is rather hampered by the lack of suitable plots. St. Lucia possesses an agricultural school conducted on an abandoned sugar estate. Candidates for admission must be not less than thirteen years of age, of good character, physically sound, and they must have passed the fourth standard. They are lodged, fed, clothed, and educated entirely at the expense of the Imperial Department of Agriculture, and their parents must enter into contract to leave them at the school for a term of years. But while their general education is amply provided for, the chief aim of the school is to fit them to become practical agriculturists in the full sense of the words, not only by teaching them to handle hoe and cutlass, and by putting them to such manual labour as their strength allows, but also by giving them all the necessary instruction in the sciences allied with agriculture. St. Vincent possesses a similar school opened in October 1900. There can be but little doubt as to the benefits which the colony should derive in the near future as the result of the establishment of such a highly useful institution.

This volume contains also an appendix written by the Archbishop of the West Indies, dealing with 'Education in Jamaica in its relation to skilled handicraft and agricultural work.' The following remarks on native agriculture are of interest:—

'As regards agriculture, in the days of slavery the black people of Jamaica learnt and practised, under compulsion, what their masters and teachers knew of cane and coffee and other cultivation. That knowledge has been handed down to their descendants, and so far as these products are concerned, as well as the growing of what is called bread-kind or ground provisions, (that is, yams, cocos, sweet potatoes, and the like) the black people of Jamaica may still be considered expert, except in so far as modern scientific knowledge requires to be applied to these cultivations. But as regards the numerous other products that need to be cultivated in the place of the doubtful and failing industries, the black

people have everything to learn. All that concerns what may be called farming (as distinct from cane and coffee growing)—all the various things involved in the proper production and preparation for the market of the numerous fruits of the island, and the development of minor industries, and all that concerns dairying on modern and profitable methods—all these things require to be learnt from the beginning. The people generally have no reliable knowledge and experience in these things.'

An account is given of the efforts that have been made, by various agencies, to promote a knowledge of the principles of scientific agriculture. These include the teaching of agriculture in elementary and secondary schools, the establishment of farm schools, the work of the travelling instructors, etc.

ORANGE WINE.

The following account of the preparation of orange wine is taken from the *U. S. Monthly Consular Reports* for October 1904:—

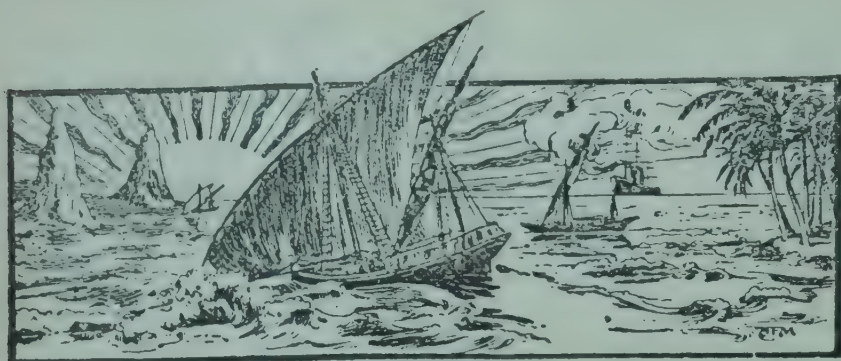
Mr. Pairault, a pharmacist in the French colonies and the author of a notable work on rum, has made a special study of fermentation, particularly in Martinique. As a result of this study he has published an interesting work in which, among other things, the rational preparation of orange wine is treated. He says:—

'In the Antilles, orange wine has been made for some time in the following manner. The oranges are peeled and pressed by hand. To the juice thus obtained sugar is added, and it is subjected immediately, in a vessel made of glass or earthenware, to spontaneous fermentation, which in general takes place easily because the ferment which determines it is often found in the oranges themselves. This spontaneous fermentation proceeds slowly because the sugared orange juice is not a very nutritious medium for the yeast, and consequently an acetic acid fermentation sets in that yields a detestable product. For this reason it is very rare to meet good orange wine. Many times the flavour differs with the different producers. Doubtless nothing is easier than to secure a satisfactory product and a constant type.

'After the orange juice has been sterilized sufficiently there should be added to every quart of the liquid 12.25 oz. to 14 oz. avoirdupois (350-400 grammes) of sugar, 0.175 oz. avoirdupois (5 c.c.) of brewer's yeast, and 2 oz. of a mixture made of the following proportions: ammonium phosphate, 30; calcium phosphate, 40; potassium bitartrate, 40; magnesium sulphate, 3. When the mixture is cooled fermentation proceeds, and in a few days there results an excellent product. A sweet or dry wine may be made by increasing or diminishing the amount of sugar added.'

APPOINTMENT VACANT.

The post of Agricultural Instructor under the Imperial Department of Agriculture is vacant at Grenada. Candidates should not be more than thirty years of age, active, accustomed to ride, and with good experience in practical agriculture, especially cacao planting. Salary £150 per annum, with forage allowance £45, and subsistence allowance at the rate of 6s. for each twenty-four hours (not exceeding 200 nights in the year) absent on duty. Applications to be addressed to:—The Imperial Commissioner of Agriculture, Head Office, Barbados.



GLEANINGS.

Dr. Watts writes: 'You will be pleased to learn that of the first shipment of 73 bales of cotton from Antigua, 5 bales have been sold at 1s. 3d. per lb. and 44 at 1s. 2d., the remaining 24 bales had not been sold when the mail left.'

According to the *St. Christopher Advertiser*, it is probable that Sir Robert Bromley, Bart., will be returning to St. Kitt's in October to resume the duties of Administrator of St. Kitt's-Nevis.

According to the *Journal d'Agriculture Tropicale* a French translation of this Department's pamphlet (No. 31) —'A.B.C. of Cotton Planting'—is shortly to be issued. Its title will be 'A.B.C. de la Culture du Coton.'

Prices for molasses are firm, and a very fair trade is going on. Halifax prices are as follows:—Choice Porto Rico, 38c. to 40c.; extra-choice Porto Rico, 40c. to 42c.; fancy Trinidad, 42c. to 44c.; choice Trinidad, 35c. to 36c.; Barbados, 40c. to 42c. (*The Maritime Merchant*.)

In Dutch Guiana the Surinam Government contemplates the establishment of great central factories in that colony. This information is furnished to the press by M. Havelaar, Chief of the Department of Agriculture at Paramaribo. (*Louisiana Planter*.)

The *Pharmaceutical Journal* describes the preparation of 'neutral cocoa-nut soap.' This soap, which is made with cocoa-nut oil, is useful for dermatological practice and specially so for ophthalmic work. It is proposed to call it 'Sapophthal.'

In Trinidad the average yield of cacao is placed at 12 bags (of 170 lb. each) per 1,000 trees planted 12 feet apart. This is at the rate of about 620 lb. per acre. In Grenada the average yield is somewhat higher, viz., 784 lb. per acre.

The exports of cacao from Dominica increased from 851,334 lb. in 1894-5 to 1,309,577 lb. in 1902-3. The following year, owing principally to the hurricane, there was a slight decrease. It is expected that in a few years, when the new settlers' estates come into bearing, there will be still further increase in the output.

There are several pupils at the St. Lucia Agricultural School who will complete their term of training in the course of a few months, and the Agricultural Superintendent is desirous of securing suitable situations for them to enter when they leave the school. Applications for their services should be addressed to the Agricultural Superintendent.

The index and title-page to the fifth volume of the *West Indian Bulletin* will be distributed by next mail with the first number of Volume VI.

A somewhat remarkable feature of the table of exports given in the *Annual Report* on the Leeward Islands, is that, while the exports of molasses in 1903-4 were less in quantity by 1,390 puncheons than in the previous twelve months, their value was greater by £20,064.

The Secretary of the West India Committee writes: 'Cotton prices are maintained, Sea Island is quoted at 14d.; medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. During the past fortnight 370 bales have been imported into the United Kingdom.'

If pimento berries are collected when nearly ripe they become almost black in colour as they dry and are deficient in aroma; in addition they become gradually covered with a saccharine exudation, which gives them a very unattractive appearance. Such pimento berries are often artificially coloured by means of a ferruginous material, probably a bole or brown ochre. (*Pharmaceutical Journal*.)

According to the public telegrams, the Lord Mayor of London opened the Colonial and Indian Exhibition at the Crystal Palace on the 12th. instant. 'The West India Court is an imposing structure decorated with sugar-canes. Some growing exhibits from Barbados, Trinidad, Grenada, and Jamaica are much admired and make the display more comprehensive and varied than any previously seen.'

A correspondent of the *India Rubber World* mentions that a process for the production of rubber from the banana has been patented by Mr. Otto Zurcher, a German chemist formerly in charge of the Hon. Evelyn Ellis' tobacco estates at Montpelier, Jamaica. He adds: 'It would take a good deal to convince me that banana rubber has any commercial value.'

In a recent report, Mr. J. Spencer Hollings, Agricultural Instructor for Nevis, remarks, with reference to the sugar crop: 'in low-lying land the sun is already affecting the juice and making it boil "puffy."' This remark is of interest in connexion with the allusion to 'scorching' in Dr. Watts' paper on muscovado sugar in the *Agricultural News*, Vol. IV, p. 99.

The Agricultural Superintendent, St. Vincent, is prepared to receive written applications from parents or guardians, especially those owning land, for admission of boys into the Agricultural School. The boys must be at least thirteen years of age, and of good character, and have passed the fourth standard. It is desirable that candidates should possess some natural taste for agricultural work. Candidates will be examined by the resident master as to their general knowledge, and by the medical officer as to their physical fitness.

By request we insert the following:—

The Secretary (W. N. Winn) of the Kew Guild, Royal Botanic Gardens, Kew, has for sale a few copies of the *Kew Guild Journal* for 1896 which contains an article full of interest to colonists, by Dr. (now Sir Daniel) Morris, on 'Kew Men and Botanical Work in the Colonies.' Price of Journal 1s. Postage 1½d. extra.

PIG REARING IN TRINIDAD.

The following statement on pig rearing at the Government Farm, Trinidad, has been forwarded by the Manager (Mr. C. W. Meaden):—

The herd was started with three sows and a boar costing, at the start, \$80·00. A new boar has since been purchased, bringing the capital cost of the stock up to \$105·00. From these the number of sows was increased to twelve, and this season 112 young pigs were sold readily at \$3·00 each at between two to three months old, the demand for them being much greater than could be met.

One of the most interesting features is that from this small commencement the stock has been increased to the value of \$260·00 and \$779·00 deposited as the result of sales within three years. The expenditure for food was \$146·00, which is about \$1·00 per month per head. But this money was not spent, as all were fed on the produce grown on the farm, supplemented by the waste from the general food store, so that the amount shown has only a relative value.

The food grown consisted of bananas, sugar-cane, corn, Guinea and Para grass, Guinea corn, sweet potatoes, etc., all of which can be put to good account in rearing pigs. The bananas and potatoes are cooked with the waste, the other is passed through a chaff cutter and given as 'chop chop.'

To get the best results from feeding, comfortable styes should be provided for the pigs. I prefer concrete flooring with partitions of the same or of galvanized iron sheets and wire netting above to protect against the attacks of bats. It will be found to pay to make the pigs comfortable and keep them clean, exercising and bathing being also essential. This is how they are treated at the farm; the pen can be entered at any time without one becoming soiled or inhaling unpleasant odours.

The animals are of the breed known as Tamworths, red in colour, with elongated snouts; they are prolific, good mothers, easily and cheaply reared, and have proved themselves well adapted to the climate.

In connexion with the proposed banana industry, pig keeping should play an important part; they would profitably consume the waste fruit and provide a large quantity of very useful manure. The two, combined on a large scale, must, I think, lead to successful results.

Very few give a thought to the considerable sum of money that Trinidad spends upon the importation of pigs and their products, and of course the amount expended is practically lost to the colony.

Most of the pig meat provided for the market is repugnant to the better class of consumers, and the inspection records relate how many pigs' lungs are condemned. This indicates the class of animal the market is supplied with, for if the flesh is not unfit for consumption, it is generally anæmic and necessarily deteriorated in value as food.

Statement of Pig Account for April 1, 1904, to March 31, 1905.

46 pigs sold privately at \$3·00	...	\$138·00	
24 " " " " 3·00	...	72·00	
42 " " " " 3·00	...	154·00	\$364·00
1 boar and 2 sows sold at annual sale		\$ 67·00	
2 sows sold by auction at agricultural show	...	67·00	
1 sow sold to butcher	...	12·00	146·00
Total receipts	...		\$510·00

Total receipts (brought forward)	...	...	\$510·00
Cost of labour per annum	...	...	\$ 96·00
Cost of feed " "	...	...	146·00
			\$242·00
Less value of manure, 60 tons at 48c.		28·80	213·20
Profit	...	...	\$296·80
Value of stock on hand:			
1 boar and 7 sows	...	...	\$260·00
136 young born; 112 sold; 24 died.			

ELECTRIC PLOUGHS IN ITALY.

The following account of the use of electric ploughs is taken from the U.S. *Monthly Consular Reports* for January 1905:—

The Società Elettrotecnica Italiana, of Turin, has invented and constructed devices for the application of electric power to ploughs and other farm machinery. The experiment of ploughing by electric power was recently made near this city in the presence of representative men from different parts of Italy and, it is reported, with gratifying success.

The device consists of two power cars, which are stationed at each side of the field and between which are stretched cables attached to the plough. The electric current is taken from a trolley line; a current of about 500 volts is said to be needed. Each car is said to communicate 25 horse-power, which can safely be increased to 40 horse-power. The plough is pulled by the cables from one side of the field to the other, and when it reaches the end of the furrow it stops automatically, the current being cut off. It can be run backward or forward with ease. One man manages the plough, and each car is operated by one man. Thus three men do all the work.

Of course, much depends on the condition of the soil, but it is said that from 7 to 15 acres can be ploughed in twelve hours. These power cars are said to be as easily managed as traction engines, and their power can be applied to thrashing machines, cornshellers, pumps, grain drills, etc.

THE TRUMPET TREE AS A FODDER PLANT.

Mr. George F. Branch, Agricultural Instructor at Dominica, writes as follows: In the last issue of the *Agricultural News* (Vol. IV, p. 127), I read an article on the trumpet tree (*Cecropia peltata*). I should like to draw your attention to the value of this tree as fodder for animals, as no reference was made to its value in this line. Cattle are very fond of it and will often eat the leaves in preference to grass. In the forest lands of Dominica the trumpet tree is very common, and whenever the land is cleared it generally grows quite thick from seed scattered evidently by the wind, in addition to the old stumps, which will stand cutting back for a long period. In such places where grass is generally very scarce, and when a settler might be inclined to keep a cow for supplying his milk, but on account of the scarcity of grass is unable to do so, the end part of the branches, about 12 inches from the tip of the stem, and the leaves distributed on the harder parts of the stem will be found very valuable as fodder.

AGRICULTURAL EFFORTS AT GRENADA.

The appointment of Mr. R. D. Anstead, B.A., as Superintendent of Agriculture at Grenada will, it is hoped, mark a new departure as regards agricultural efforts in that colony.

Since the inauguration of the Imperial Department of Agriculture, Grenada has been largely assisted by funds in aid of its agricultural services, and the officers on the staff of the Department have devoted considerable attention to the treatment of insect and fungoid pests affecting cacao. In addition three courses of lectures on agricultural science have been delivered to the teachers in charge of elementary schools, and grants have been provided for prizes at the Agricultural Shows.

Proposals for re-organizing agricultural efforts at Grenada were made by the Imperial Commissioner of Agriculture at a special meeting of the Grenada Agricultural and Commercial Society (the Governor in the chair), held on May 13, 1904.

The points that were specially dwelt upon as essential to the success of a re-organized department were as follows: (1) that two officers, viz., a capable Superintendent of Agriculture with a sound knowledge of soils and manures (as desired by the Agricultural Society), and an active Agricultural Instructor, to give his whole time to the improvement of cacao cultivation amongst peasant proprietors, should be appointed with as little delay as possible; (2) that the operations of the agricultural department should be placed under the entire control of the Imperial Commissioner of Agriculture who would be assisted by an Agricultural Experiment Committee appointed by the Agricultural and Commercial Society.

The points above referred to having now been definitely arranged, it is hoped that no further delay will take place in starting such efforts at Grenada as will fully meet the requirements of the planting community.

The Botanic Station is proposed to be carried on mainly on agricultural lines with the view of reducing expenditure. Ornamental plants will not receive so large attention as formerly, and such economic plants as are actually required in the colony will only be raised (in large quantity) when orders are received, beforehand, for them.

It is proposed to start a new series of cacao and other plots, under the charge of the travelling Agricultural Instructor, with the co-operation of the Agricultural Experiment Committee. The new plots will be established in districts where they will be of special advantage to peasant proprietors, in the hope that greater interest will thereby be created in improving the cultivation, and the yield and quality of produce in such districts. The former series of cacao experiment plots were steadily carried on for four years, and, as shown at the recent Agricultural Conference at Trinidad, they had proved of service to both large and small cultivators. On a typical plot, the increase of crops due to better cultivation and the use of manures was shown to be from 5½ bags per acre in 1900 to 8 bags per acre in 1903.

School Gardens will be encouraged by assistance to be afforded by the Agricultural Instructor and the gift of seeds and plants from the Botanic Station.

In view of the large number of small proprietors existing in the island (11,452 with holdings between 5 acres and 50 acres each), what Grenada appears specially to require is a good Agricultural School where youths could receive a sound practical training and thus be fitted for taking charge of numerous properties that are, at present, in danger of being abandoned owing to careless and ineffective methods of cultivation. According to a statement made at the meeting in May 1904, Grenada during the last ten years has apparently spent less on agricultural education than any other colony with similar resources, in the West Indies.

The following are the members of the Agricultural Experiment Committee appointed by the Grenada Agricultural and Commercial Society to co-operate with the Imperial Department of Agriculture:—

The Hon. C. M. Browne, C.M.G., (President), Hon. D. S. deFreitas, Mr. P. J. Dean (Vice-Presidents), Hon. F. Gurney, Hon. G. S. Seton-Browne, Hon. Joseph T. de la Mothe, Mr. E. M. deFreitas, the Rev. G. W. Branch, Mr. L. R. Mitchell, and Mr. R. L. Ferguson.

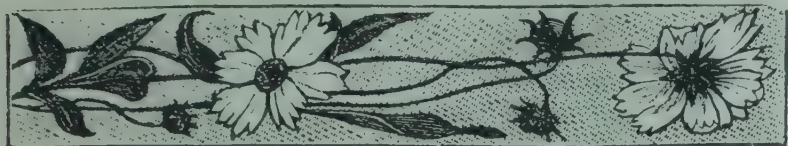
DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture will proceed to Tobago on May 22, to meet his Excellency Sir Henry Jackson who will then be on a visit to that island. A public meeting of planters is to be held in the Court House at Scarborough on Wednesday (noon) in connexion with the cotton and other industries. It is probable that Sir Daniel Morris will accompany the Governor to Trinidad and return to Barbados in C.L.S. 'Oruro' on the 28th. instant.

Mr. Lawrence Lewton-Brain, B.A., late Scholar of St. John's College, Cambridge, for the last three years Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, has been offered and has accepted the appointment of Assistant Director of the Pathological Division of the Experiment Station of the Hawaiian Sugar Planters' Association. Mr. Lewton-Brain will probably vacate his present appointment early in July next.

Mr. Rudolph David Anstead, B.A., of Christ's College, Cambridge, Assistant Chemist in connexion with Sugar-cane and other Agricultural Experiments at Barbados, has been appointed by the Secretary of State for the Colonies to the post of Superintendent of Agriculture in the colony of Grenada. Mr. Anstead will probably embark for Grenada by the mail steamer on June 6 next.

Mr. L. Lewton-Brain, who has recently returned from a periodical visit of inspection of the Agricultural School at St. Vincent, proceeded in the C.L.S. 'Orinoco' on the 15th. instant on similar visits of inspection of the Agricultural Schools at St. Lucia and Dominica. Mr. Lewton-Brain is expected to return to Barbados in the Royal Mail steamer due this morning.



JAMAICA ORANGE INDUSTRY.

The following figures, extracted from the report of the Collector General, show the present position of the orange and grape fruit industry in Jamaica. It will be seen that the industry is of considerable value to the colony:—

EXPORTS OF ORANGES DURING TEN YEARS, 1895-1904.

	Number.	Value.
1895	29,978,895	£ 48,715
1896	97,025,398	169,794
1897	103,702,775	155,554
1898	88,013,091	134,673
1899	107,190,041	123,715
1900	107,444,200	145,049
1901	88,825,650	115,473
1902	79,061,650	102,780
1903	98,589,575	101,054
1904	82,630,540	72,301

EXPORTS OF GRAPE FRUIT DURING FIVE YEARS, 1900-4.

	Packages.	Value.
1900	10,532	£4,067
1901	14,410	8,261
1902	17,315	7,671
1903	20,885	9,188
1904	20,557	8,698

The following references are made to the position of the industry, especially in regard to the need for greater care in selecting and packing the fruit, in the *Annual Reports* for 1901-2 and 1902-3:—

In the years 1899 and 1900, when great quantities were shipped, much harm was done to the reputation of Jamaica oranges by wholesale consignments of undersized and immature fruit and of other stuff rendered worthless by careless picking and bad packing. The trade can, I believe, by careful handling be made more valuable to the island than it has ever yet been, but this can be effected only by repairing and fostering the good name of Jamaica fruit in the markets of the United States and Great Britain. A steadily increasing quantity of fine oranges of selected varieties is now coming into the market from planted groves, the produce from which, even if not in all cases superior to the native 'wild' fruit, is less liable to be injured in picking, and can be packed to greater advantage.

The export of grape fruit, which shows little recent advance in value, may be expected to increase before long in like manner.

Oranges showed an increase [in 1902-3] of nearly one-fourth in amount and a decrease in value of £1,726, the total value exported, however, being still of some considerable amount, viz., £101,054. The decrease in value with an increase in the volume of the trade bears out the remarks made in last year's report as to the need for greater care in the handling of this trade and restraint in the matter of the shipment of poor and immature fruit.

The other product of the citrus family, known as the grape fruit, which finds much favour in the American market, showed an increase in value of £1,517, or about one-fifth.

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following report, dated April 13, 1905, on the position of West Indian products on the Canadian market during the month of March:—

During the month of March a marked improvement for import business took place, though not fulfilling the anticipated demand. General business continues quiet, mainly kept in check by lack of transport in the country during the present thaw and advancing spring. Immigration is again on an increased scale from Europe. The opening of navigation will take place within a fortnight.

CANADIAN AND WEST INDIAN MAIL SERVICE.

The time for the sending in of tenders has already passed; only one tender has been submitted, but no decision has yet been arrived at.

SUGAR.

An irregular and weakening market for beet sugar had a lowering tendency for prices of cane grades, and March saw lower quotations generally, though with very little fluctuation. Muscovado sugars offered from the West Indies had a poor field in Montreal. Consignments from the islands to Halifax are the sole cause for the low counter bids; 2 $\frac{3}{4}$ c. to 2 $\frac{7}{8}$ c. being the most recent figures of buyers, and some sales being actually made at these figures; 96° centrifugals were in a better position, there being very little available on spot. Refiners have secured supplies from Mauritius, Argentine, and Belgium, Argentines now being delivered. This is mainly owing to the high prices recently asked by the West India growers. Two steamers, however, are expected early in May with sugar and molasses from the islands and Demerara.

MOLASSES.

The rapidity of the advance in price of molasses in the British West Indies has had a deterring effect on business here, especially with regard to Barbados; buyers being of the opinion that lower prices will be reached as soon as speculation has ceased. Holders here ask 38c. per imperial gallon, ex wharf, which many buyers decline to pay. New Orleans at 30c., Porto Rico at 38c., and Leeward Islands at 28c. to 30c., last year's crop, are being offered and some parcels are changing hands. A large amount of blended molasses is likely to be in evidence this year.

COCOA-NUTS.

The market is fairly supplied and prices are steady. The New York market has fallen sharply at \$2.00 to \$5.00 according to the source of supply, but this has not affected Canadian markets materially. Supplies from Caicos Islands have not proved satisfactory, nor have recent Demerara shipments.

SPICES.

The spot market remains very quiet. Pimento very dull and small lots sold at 5 $\frac{1}{4}$ c. Ginger, quiet, 7 $\frac{1}{8}$ c. to 10 $\frac{1}{2}$ c. Nutmegs steady at late rates.

COFFEE.

General business very quiet. Jamaica grades steady at 10c. to 10 $\frac{1}{2}$ c. Similar grades Maracaibo, 11c.; Bucuramanga, 12c. to 13c.; and Guatemala, 11 $\frac{1}{2}$ c.

MARKET REPORTS.

London,—April 25, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' April 20; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 19, 1905; and 'THE PUBLIC LEDGER,' April 22, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 13/- to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/6 to 1/7 per lb.
BEES'-WAX—£7 10s. to £7 15s. per cwt.
CACAO—Trinidad, 56/- to 61/- per cwt.; Grenada, 52/- to 54/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—4/- to 5/- per bunch.
GRAPE FRUIT—5/- to 6/- per case.
ORANGES—8/- to 10/- per case.
PINE-APPLES—1/8 to 3/9 each.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, middling to fair bright, 36/- to 38/6; ordinary to good ordinary, 30/- to 36/6 per cwt.

HONEY—16/- to 28/- per cwt.

ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 1/- to 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/5 to 1/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Pale West Indian, 1/4 to 1/5; red, 1/2 to 1/3; broken, 1/2 per lb.

NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.

NUTMEGS—68's, 1s. 3d. to 1s. 4d.; 78's, 9½d.; 125's, 6d. per lb.

PIMENTO—2½d. to 2½d. per lb.

RUM—Demerara, 1s. 3d. to 1s. 4½d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.

SUGAR—Yellow crystals, 19/6 to 21/- per cwt.; Muscovado, Barbados, 19/6 to 20/- per cwt.; Molasses, 14/- to 18/- per cwt.

SULPHATE OF AMMONIA—£12 13s. 9d. per ton.

Montreal,—April 13, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.

CEDAR—No quotations.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$21.00 to \$23.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1.32 per 100 lb.

MOLASSES—Barbados, 37c.; Antigua, 31c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5c. to 5½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Grey crystals, 96°, \$3.50 to \$3.75 per 100 lb.

—Muscovados, 89°, \$2.85 to \$3.00 per 100 lb.

—Molasses, 89°, \$2.60 to \$2.80 per 100 lb.

—Barbados, 89°, \$2.90 to \$3.00 per 100 lb.

New York,—April 28, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.

COCOA-NUTS—No quotations.

COFFEE—Jamaica, 8½c. to 8¾c. per lb. (ex store).

GINGER—Jamaica, 5½c. to 6c. per lb.

GOAT SKINS—Jamaica, 58½c. to 60c. per lb.

GRAPE FRUIT—Jamaica, \$4.50 to \$5.00 per barrel.

MACE—West Indian, 30c. to 34c. per lb.

NUTMEGS—West Indian, 110's, 14½c. to 15c.; 80's, 22c. per lb.

ORANGES—Jamaica, \$3.50 to \$4.00 per barrel.

PIMENTO—4½c. per lb.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 4c.;

Molasses, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 3, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—27c. per gallon, package included.

SUGAR—No quotations.

Barbados,—May 6, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.60 per 100 lb.

CACAO—Dominica, \$12.00 to \$12.50 per 100 lb.

COCOA-NUTS—\$16.00 per M for husked nuts.

COFFEE—\$10.50 to \$12.00 per 100 lb.

HAY—\$1.10 per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—21½c. to 22c. per gallon.

ONIONS—Madeira, \$2.62 per 100 lb.

POTATOS, ENGLISH—\$1.60 to \$1.73 per 160 lb. (retail).

RICE—Ballam, \$4.40 per bag (190 lb.); Patna, \$3.25 per 100 lb.

SUGAR—Muscovados, 89°, \$2.15; Dark crystals, 96°, \$2.70 per 100 lb.

British Guiana,—May 4, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 13½c. to 14c. per lb. (retail).

—Creole, 12c. per lb.

DHAL—\$3.80 to \$4.00 per bag of 168 lb.

EDDOES—\$1.20 per barrel.

MOLASSES—Vacuum Pan yellow, 16c. per gallon (casks included).

ONIONS—Lisbon, 4½c. per lb.

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—\$1.90 to \$2.00 per barrel.

RICE—Ballam, \$4.25 per 177 lb.; Creole, \$3.90 per bag.

SWEET POTATOS—Barbados, \$1.20 per bag; \$1.44 per barrel.

TANNIAS—\$1.44 per barrel.

YAMS—White, \$1.68 per bag.

SUGAR—Dark crystals, \$2.80 to \$3.00; Yellow, \$3.80 to \$4.00; White, \$4.80 to \$5.00; Molasses, \$2.90 to \$3.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—May 4, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.75 to \$12.00; estates, \$12.15 to \$12.75 per fanega (110 lb.); Venezuelan, \$12.40 to \$13.00 per fanega.

COCOA-NUTS—No quotations.

COCOA-NUT OIL—74c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9c. to 9½c. per lb.

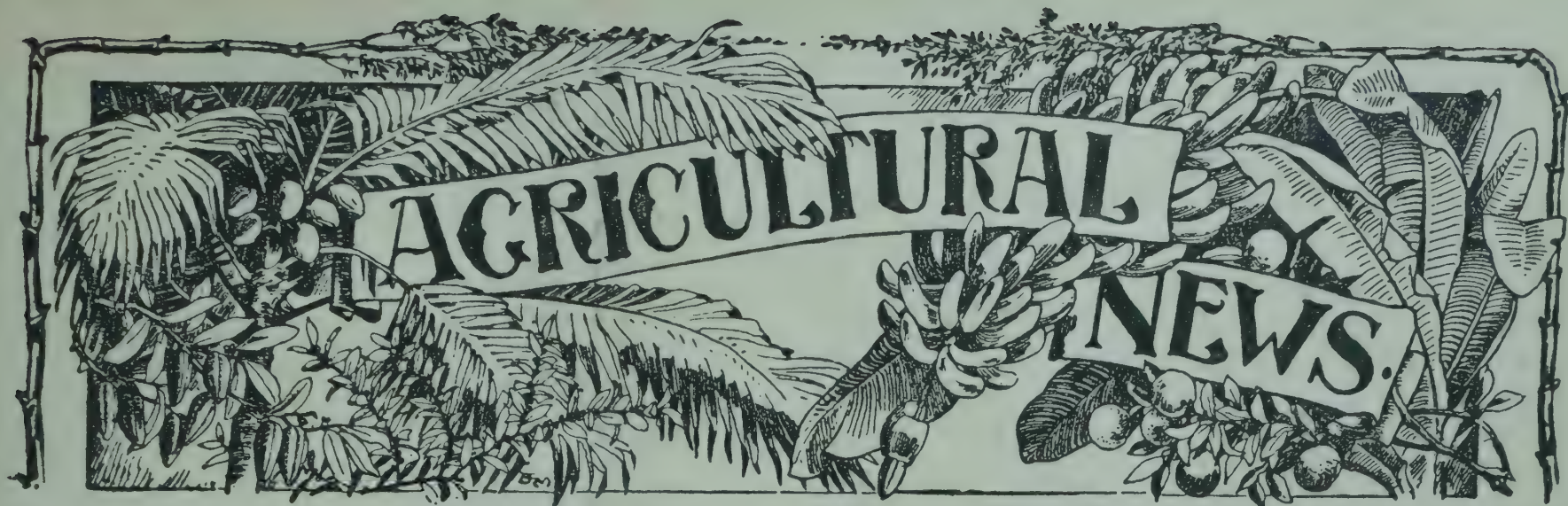
COPRA—\$2.75 to \$2.90 per 100 lb.

ONIONS—West Indian, \$1.80 to \$2.00 per 100 lb. (retail).

POTATOS, ENGLISH—80c. to \$1.00 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; white \$4.75 to \$5.75 per bag.

SUGAR—White crystals, \$4.50; Yellow crystals, \$3.50; Molasses sugars, \$2.75 to \$3.75 per 100 lb.



A FORTNIGHTLY REVIEW

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Cacao Cultivation in the West Indies.



At the West Indian Agricultural Conference at Trinidad in January last, an interesting and useful discussion took place in

connexion with the cacao industry. The general opinion of those present appeared to be that considerable improvement had been shown during the last few years in the methods adopted in cultivating this crop, and that the planters were realizing the necessity for higher cultivation.

In several of the West India Islands cacao experiment plots have been in operation for some years under the direction of the Imperial Department of Agriculture, and the experience gained from these experiment plots, as well as the personal experience of such planters as have themselves been in the habit of conducting experiments and making observations, has indicated very clearly that more scientific methods of treating the soil and the trees have resulted in an increased yield: good results have been obtained from the use of pen manure and of sheep manure; other planters have satisfied themselves of the economy of using chemical manures, principally basic slag; others, again, have learned the advantage of paying close attention to approved methods of pruning and the prevention of disease.

The best results are not to be obtained by attending merely to manuring or merely to pruning. The cacao tree is very susceptible to unfavourable conditions of the soil. Experiments throughout the West Indies have clearly demonstrated that little improvement can be brought about by the use of manures—natural or artificial—unless the soil is well drained. Without subsoil drains in a wet clay soil manure is useless. The question of deep drainage has also an important bearing upon the occurrence of fungoid diseases. Since healthy vigorous trees are

rarely attacked by these diseases, every effort should be made to attend to the health of the trees.

In the case of fungoid diseases cacao planters are strongly urged to adopt *preventive* measures. Neglected trees are sure to develop these diseases; once developed, much money and trouble will have to be expended to eradicate them. The preventive methods are extremely simple. They consist in proper methods of pruning; branches cut close to the stem, wounds tarred over, diseased parts burned, and pods and shells buried. It was stated at the Conference that, as the result of the adoption of these measures, one planter in Trinidad expected to reap about 25 per cent. more cacao than he would otherwise have done.

Considerable interest attached to the discussion on the subject of shade for cacao. It may be that this is a matter which depends entirely upon local conditions. At any rate, the facts remain that Trinidad planters are firmly convinced that shade trees are absolutely necessary and indispensable in that island; that in Grenada no shade is used, although a higher yield is obtained; while in Dominica, though no shade trees are present, wind-breaks, usually of the 'pois doux' (*Inga dulcis*), are planted across the plantations to protect them from the wind. Although it may be, as has been suggested, that this difference of methods is due to difference in climatic conditions, it is possible that further experiments will cause some modification of the somewhat strongly-held convictions on this point. It is quite evident that no hard and fast rules can be laid down for the guidance of planters in matters of this kind; each planter will have to decide for himself the line of action most likely to suit his special conditions.

Another point upon which it is hoped to have further information later on as the result of experiments is in the matter of the most suitable variety for these islands. Up to the present the Forastero has been almost exclusively planted. This is the hardiest of all the varieties, but its product is not of the highest quality. The Criollo variety produces the best quality of cacao. It is, however, unfortunately, somewhat delicate, and though several attempts have been made to establish regular plantations of it in the West Indies, these have, in many cases, been abandoned. It was suggested by the Hon. William Fawcett that the Criollo might be budded on to Forastero stocks, experiments in Jamaica having shown that this can successfully be done.

The growing importance of the cacao industry in the West Indies has already been referred to in the

Agricultural News (Vol. III, p. 305). In order that the progress may be maintained, cacao planters are urged to do all in their power to bring about an improvement in the health and productiveness of their trees.



SUGAR INDUSTRY.

Jamaica.

The following is a letter from the special correspondent in Jamaica of the *Louisiana Planter*, in which reference is made to the revival of the sugar industry:—

The firmness of the sugar market and the relatively high prices now being obtained for cane sugar are having a healthy effect in stimulating planters to extend the area of their cultivation. Coincident with this revival of the industry, certain schemes are on foot for the establishment of central factories, one in Vere, and the other in St. Elizabeth. The one in Vere has already taken shape, the firm of De Pass & Co., of London, in which Mr. C. E. deMercado is interested, having bought Morelands estate in Vere. Plans for the buildings and machinery have been submitted, and it is probable that the work of erecting the necessary buildings will start within the next couple of months.

In the meantime several estates, notably Denbigh and Cornwall, are practically working on the central factory system, and the small cultivators are being induced to cultivate canes, and, to enable them to do so, the larger planters are making them cash advances.

Mr. R. E. Melhado, who has recently taken over the Lodge estate, near Old Harbour, on lease from Col. Kitchener, is about to erect new buildings and instal new machinery with a larger capacity. Mr. John Hudson, of Retrieve, in Westmoreland, has ordered a new and powerful five-roller mill of a similar pattern to the one erected at Denbigh, and has also extended his acreage. Mr. Walter Farquharson has ordered a triple-effect plant for Retreat, in the same parish. There are also new developments at Phoenix, Mr. Arnold Clodd's Hanover estate, where cane cultivation will be carried out on an extensive basis. Mr. S. Clarke is planting out 100 acres of canes at Sweet River, Westmoreland, while it is reported that the acreage on Fairfield is likely to increase.

These extensions of existing cane cultivation and the developments of improved methods in manufacture are of great significance, and augur well for the future of the sugar industry in this island. The crop now being taken off promises to be a very good one, and in quantity is likely to overtop considerably the record of the last three seasons, while in value it will easily exceed all years since 1899-1900. Up to last reports, 10,774 puncheons of rum had been exported, which is 100 puncheons better than last year's crop, while sugar exports are 1,200 tons less; but this will easily be made up between now and crop-over.

Another remarkable feature of the sugar situation is the demand for small cane mills, and one dealer reports having sold more of these to small settlers in the month of February than he had done in the six months prior to that date.

Leeward Islands.

The Leeward Islands *Blue Book* for 1903-4 has the following reference to the state of the sugar industry in the colony, under the head of 'agricultural improvements':—

Energetic steps were taken to secure for Antigua the residue of the parliamentary grant for the assistance of the sugar industry in the West Indies. These efforts were successful, and the grants were applied to encouraging the introduction of improved sugar-making machinery by offering monetary grants on condition that the sums granted were spent on improved machinery, together with proportionate and specified amounts on the part of private persons. As a result, the Bendals' sugar works have been equipped with new machinery by way of improvement on, or addition to, existing plant; a new and improved mill and engine, a triple-effect evaporator (the first introduced into Antigua), and various other appliances being installed. A still more important result was obtained by the aid of this grant in that all the arrangements were completed for the erection of a new, modern sugar factory to deal with the sugar produced on eight estates; this factory is in course of erection. By this means the much-discussed central factory question will be solved, so far as Antigua is concerned.

The cultivation of new varieties of sugar-cane continues to make progress throughout the colony; as a consequence diseases of sugar-cane have occasioned comparatively little loss of late years. The experiments conducted with varieties of sugar-cane by the Imperial Department of Agriculture are still followed with great interest.

The manurial experiments, also conducted by the Imperial Department of Agriculture, have afforded results of importance calculated to lead to economies and precision in working, and to substantial monetary savings.

Demerara Canes in Hawaii.

A bulletin on 'Comparative analyses of varieties of cane' recently issued by the Hawaiian Sugar Planters' Association gives interesting information as to the quality of the juices, the tonnage of canes, and the yields of sugar of seventeen varieties of cane harvested in April 1904.

Among the seventeen canes under experimental cultivation were three Demerara seedlings—Nos. 74, 95, and 117.

In regard to tonnage of cane per acre, the first place among the seventeen varieties is taken by D. 117 with 88 tons; D. 74 came eighth on the list with 67 tons, and D. 95, fifteenth with 48 tons.

The largest yield of sugar per acre was also given by D. 117, viz., nearly 12 tons. The other two Demerara canes come somewhat low on the list: D. 74 (9th.), 8.6 tons; D. 95 (14th.), 6.7 tons.

In regard to quality of the juice the Demerara canes do not appear to take quite as high a position. The analyses for these three seedlings are as follows:—

Variety.	Density (Brix).	Sucrose in juice. Per cent.	Purity of juice.	Glucose. Per cent.
D. 95 ...	17.43	15.7	90.1 ¹	.324
D. 117 ...	17.16	15.2	88.5 ²	.459
D. 74 ...	16.47	14.2	86.2 ³	.404

¹ Fourth on list. ² Sixth on list. ³ Twelfth on list.

It should be mentioned that the figures are based on the chemical analyses of varieties grown under identical

conditions, as far as they could be obtained, with regard to climate, soil, cultivation, irrigation, and fertilization.

Molasses in Canada.

The *Maritime Merchant* of May 4 has the following note on the molasses market in Canada:—

Since our last issue a report of 2c. a gallon reduction came from Barbados, but this has had absolutely no effect upon the prices here; and the chances are that it will not. Newfoundland has taken all her requirements, and it is said there are less than 6,000 gallons left in the island, while Montreal, which requires 12,000 gallons, has not yet taken any to speak of. No doubt the downward tendency of the sugar market has had something to do with the situation, together with the holding off of Montreal buyers, who were determined not to buy at the high prices. Prices had really gone up too quickly. However, they are likely to continue high. The very fact that remaining supplies are low, and that existing legislation is against American molasses, seems to promise that. Besides, the supplies of other British Islands molasses are very small. There is practically no Trinidad left, and sugar-making has ceased in the island for the season, and what little molasses is left is held for reboiling and distilling. The crop is over 30 per cent. short and not only that, but the percentage of molasses is smaller than usual. There is no change in Porto Rico, where things are quiet with a high and firm market. Nearly 50 per cent. of the molasses imported at Halifax so far this season has been of the last-named grade. The total importations of all grades this season to the end of April amounted to 4,500 puncheons as against 2,500 puncheons in the same period in 1904 and 1903. The excess of imports so early is explained by the early crop. In all likelihood the bulk of the twelve or thirteen thousand puncheons, which now measures our requirements, will be imported during the months of April, May, and June this year, instead of June, July, and August as ordinarily.

Halifax prices are as follows:—

Choice Porto Rico.....	38c. to 40c.
Extra-choice Porto Rico.....	40c. to 42c.
Fancy Trinidad.....	42c. to 44c.
Choice Trinidad.....	35c. to 36c.
Barbados.....	40c. to 42c.

GROUND NUTS.

The *Queensland Agricultural Journal* has the following note on pea nuts or ground nuts, to the cultivation of which the West Indies are well adapted:—

One of the easiest crops to grow, whether by itself or between the rows of some crop which takes from one to three years to mature, such as pine-apples, sisal hemp, etc., is the earth or pea nut. In the United States they are grown by almost every farmer. The nuts always command a ready sale for oil making. In America they are considered the best pig food, and thousands of bushels are used for human consumption. An American farmer in Florida sums up the advantages of growing pea nuts as follows:—They have no insect enemies; you are always sure of the crop; they will withstand more dry weather than any other crop; poor, sandy land that will not grow any other crop to pay will give a fine crop of pea nuts; such lands will yield 50 bushels per acre of nuts without any further fertilizer when they would not yield 8 bushels of corn. The vines make the finest of hay when properly cured.



WEST INDIAN FRUIT.

SHIPPING ORANGES.

Experiments conducted by the U. S. Department of Agriculture in connexion with the shipment of oranges have shown that failure has, in most cases, been due to careless handling in California rather than to the effects of transportation. Fruit that is sound when packed reaches New York in good condition.

It appears that the principal source of decay is injury to the skin of the orange by the sharp-pointed clippers that are often used in gathering the fruit. Again, too long a stem may be left on an orange: when packed this stem is liable to injure the fruit next to it.

As a result of these tests the conclusion arrived at was that carelessness in handling was the chief cause of decay, and that there is likely to be very little decay when the outer skin of the orange is entirely free from all injuries.

These are points that should be carefully considered by all shippers of oranges. Attention has already been drawn in the *Agricultural News* to the damage that has been sustained by the Jamaica orange industry through the shipment of badly selected or carelessly packed fruit.

THE MANGOSTEEN.

The following information is extracted from an interesting article on the mangosteen (*Garcinia Mangostana*) in the *Hawaiian Forester and Agriculturist*:—

This genus of tropical trees comprises about forty species, and belongs to the order of *Guttiferae*. It is a native of the Malay Peninsula, and grows well in Ceylon and Trinidad, and in the Botanic Gardens at Jamaica—but not so successfully in India. Numberless efforts are said to have been made to naturalize this tree in the tropics, but without marked success. It needs a moist and fairly equable climate, with the temperature of 72° to 76° F. and with a rainfall of about 100 to 150 inches yearly. It does not thrive so well on the open plains as it does in the sheltered valleys, with light shade.

The fruit is round, about 2 inches in diameter, and has a tough rind; it is first green, then gradually changes to pink, then finally to a rich, deep purple when ripe; inside the fruit is divided into edible segments, white in colour, and in shape and arrangements like those of the orange. These segments contain the seeds, which are dark-brown and about the size of a small Lima bean.

The flavour of the fruit is said to suggest something between the grape and a peach, and the successful ripening

under glass of this luscious fruit is considered a consummate achievement in the art of gardening.

The mangosteen is of very slow growth, but comes true to the seed, and it is said that ripened cuttings can be made to root and grow, if started under glass with strong bottom heat.

COPRA IN SPAIN.

In view of the efforts that are being made in Trinidad to establish an export trade in copra, the following note on the trade in this product in Spain, from the U. S. *Monthly Consular Reports*, is likely to be of interest:—

During recent years the cost of copra has been rather above the average, and this fact has militated against its importation into Spain. If the price were to drop again to between \$65 and \$75, at which copra was obtainable eight or ten years ago, the consumption in this country would probably increase by 30 per cent. The higher the cost of copra the smaller the consumption of the oil in Spain, as it is more advantageous to use olive oil for the manufacture of soap than an expensive copra oil.

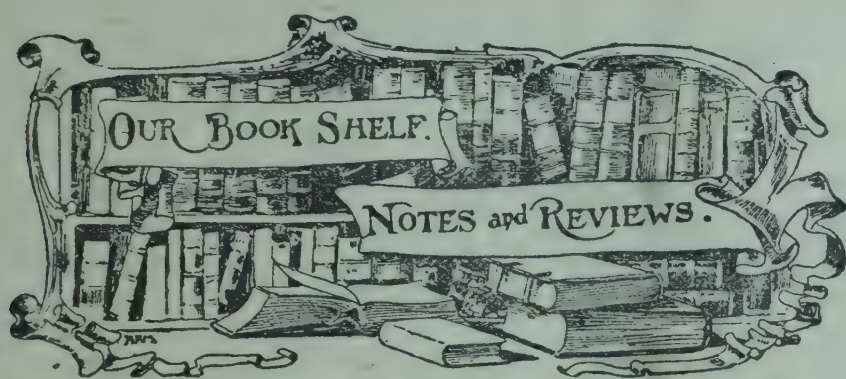
The average annual imports of copra are 10,000 to 12,000 tons at Barcelona and 18,000 to 20,000 tons in the whole of Spain. These direct shipments come chiefly from the Straits Settlements, Philippine Islands, and Celebes, though copra from other places is occasionally bought.

Copra oil is extracted in this country by the ordinary pressure system. The benzine system is practically unknown here. The estimated outturn of oil is from 60 to 64 per cent., according to the quality of the material and the process used for drying. Most of the mills in Spain have been furnished by an English firm.

The waste product is sold in cakes for fodder, and hitherto most of it has been sent abroad, though the consumption in the interior districts of Spain is steadily increasing. This year, owing to the scarcity and dearness of fodder, more than half the product has been sold in Spain.

The oil extracted from the copra is principally used in the manufacture of soap, of which there are more than thirty different varieties made here. The soap-making industry in Spain is capable of being largely developed on modern lines, because, with a few notable exceptions, the processes used in the making of soap are very antiquated.

A paper by Mr. W. Greig on the 'Cocoa-nut Oil Industry,' which will be published in the next issue of the *West Indian Bulletin*, contains practical information in regard to the manufacture of copra at Trinidad.



COTTON SEED PRODUCTS: By Leebert Lloyd Lamborn, B.S. *New York: D. van Nostrand Co. London: Archibald Constable & Co.*

This book is one of a very comprehensive character, supplying, as the author states in the preface, a treatise on the subject of cotton seed which should deal not only with the extraction of the oil from the seed, but with the utilization of the products of the seed itself.

The first part of the work treats in great detail the subject of oil extraction from the cotton seed. An interesting historical account is given, informing us that the first seed for oil extraction was sent to England from the West Indies in 1783. All the processes of oil extraction and refining are clearly given; great interest is attached to the refining, and every detail, which will enable the finest oil to be placed on the market, will be found in this volume.

No less attention is given to the other products of the seed; every part is shown to be of value. The preparation of cotton seed oil cake and meal, the treatment and uses of the hulls, and the utilization of the waste products obtained during the oil-refining process are dealt with.

A chapter is devoted to the preparation of oleomargarine and lard compounds, and another to the manufacturing of soap and soap powder, giving details of the use of the refined oil and the waste from the refining room in the preparation of these substances. The value of cotton seed and cotton seed meal for food and fertilizing purposes is clearly brought out. The last chapter is one giving rules for governing market transactions in cotton seed products.

One interesting feature of this book is the classification of the different products; all the characters which determine the qualities of the different substances are given, thus enabling the manufacturer to know what he should aim at and what he should avoid when producing for the market. Another feature which will make the book a valuable one is the information given on the defects of the different products, pointing out the probable causes and remedies.

Although it may be questioned whether the author is justified in bringing such a mass of information together in one volume, for the detailed character of the work is such that only portions can be of interest to any particular individual, yet this is certainly a book which will be most valuable to those interested in the extraction of cotton seed oil, and in the preparation of cotton seed cake and meal.

Plant Nurseries in St. Vincent. Nurseries for the raising of cacao seedlings have been started on some of the estates acquired in St. Vincent for the Land Settlement Scheme. Large numbers of cacao and other permanent economic seedlings have been planted out on the allotments, since the estates were acquired. Up to the present the seedlings have been supplied from the Botanic Station. The present arrangement will avoid the difficulties and dangers of transport, which, in some cases, are considerable. The first nursery was started in February on the Cumberland Valley estate.

SCIENCE NOTE.

The Meaning of Spines on Plants.

A recent issue of the *New Phytologist* (Vol. IV, p. 79) contains a paper by Dr. L. Ccckayne on the 'Significance of spines in *Discaria Toumatou*.' In this paper, the author describes experiments bearing on the biological meaning of the spines. It is well known that many desert (xerophytic) plants are characterized by possessing hard, sharp spines or prickles, which are usually regarded as adaptations for protection against grazing animals. The following are extracts from this paper:—

Discaria Toumatou, the 'Wild Irishman' of the Colonists, is a common New Zealand xerophytic shrub, or occasionally a small tree, chiefly remarkable for being abundantly furnished with rather long and very pungent spines, which are in fact shoots of limited growth capable of assimilating carbon dioxide. The characteristic stations of this plant are: stable sand-dunes; stony plains, river-beds, and terraces; dry, frequently clayey hill-sides, and slopes of stony debris, or even rock-faces. In some places, the plants are isolated; in others they form dense thickets, unpleasant to penetrate. The terete spines are arranged decussately at distances of about 2 cm. and measure 2 cm. to 3 cm. in length and 1 mm. to 1.5 mm. in diameter.

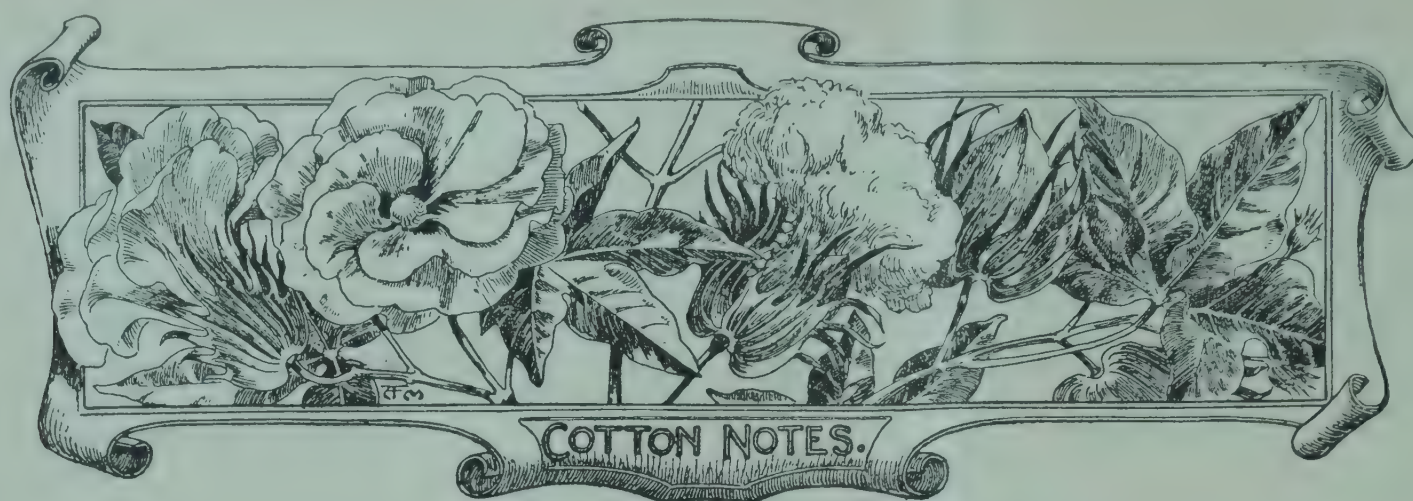
The early seedling form is quite without spines, being an erect, leafy plant. After attaining a height of several centimetres, probably varying considerably according to environment, spines commence to be developed from the axils of the leaves as in the adult, and the plant thenceforth becomes by degrees comparatively leafless and very spinous. The juvenile leaves are very similar to those of the adult, but are thinner and the earliest leaves are toothed.

Two such seedlings artificially raised from seed in a greenhouse, after developing one or two spines, were placed by me more than three years ago in a glass case, so constructed as to keep the inside atmosphere constantly saturated with moisture, in order to see if the plants would continue to produce spines; i.e., if this artificial environment would inhibit the formation of spines. The conditions provided would not only expose the plants to moist air, but the light would be considerably more feeble than that of the normal stations of the *Discaria*. Such conditions, indeed, would be those of a rain-forest interior rather than of a plain or hill-side in the open, however wet the climate.

After being placed in the moist chamber, the plants developed no more spines and are now seedling plants in all respects except for the few spines, which were developed prior to the culture in moist air. Moreover, it seems evident that such plants would remain in the seedling form so long as they were kept in an atmosphere constantly moist and exposed to a feeble light.

That spines on xerophytic plants are an adaptation against the attacks of grazing animals is a matter of such general belief as to be admitted into certain botanical textbooks as a proved fact.

It seems, however, to me that my experiment, detailed above, is a fairly crucial case, and that in *Discaria Toumatou*, at any rate, the spines are a direct response to conditions of dryness, and function as a special contrivance for checking transpiration. If so, then they have nothing to do primarily with attacks of grazing animals, especially when it is borne in mind that New Zealand never contained such, excepting the various species of *Moa*.



St. Vincent.

Mr. W. N. Sands writes as follows, under date May 19, 1905, with regard to the operations at the St. Vincent cotton factory :—

At the factory the total number of bales made so far is 229, and contained 76,732 lb. of lint. So far the price of 1s. 5d. per lb. has been maintained for cotton shipped to the British Cotton-growing Association. By to-day's mail about 70 bales are being forwarded.

The work of disinfection and selection of locally grown seed has been continued, and the quantity dealt with for local use and export since the work was commenced totals 15,389 lb. Of this amount 8,123 lb. of selected and disinfected seed have been delivered.

Cotton Seed Disintegrators.

The Christy and Norris disintegrators, contributed by the British Cotton-growing Association, in use for crushing cotton seed at the central cotton factories at Barbados and Antigua, are in regular working and they give every satisfaction. The seed is crushed for the use of planters, as required, at a moderate charge, and is largely used for feeding cattle.

There are similar disintegrators installed at the central cotton factories at St. Vincent, St. Kitt's, and Nevis. The first of these disintegrators was introduced by Messrs. Sendall & Wade at Spooner estate, St. Kitt's, in 1904.

Sea Islands Market Report.

The market report of Messrs. Henry W. Frost & Co., dated Charleston, S.C., May 6, 1905, has the following :—

The sales consisted of about 1,000 bags of planters' crop lots, classing fully fine to extra fine on private terms, which were reported in our last.

This leaves an unsold stock of about 900 bags, of which 400 bags class fine and fully fine, and 500 are tinged and stained. Factors are disposed to sell on a basis of quotations. We quote : stained and tinged, 12c. to 17c. ; fine, 20c. ; fully fine, 23c. ; extra fine, 24c.

With the exception of some complaints of too much rain, the advices generally are fairly favourable as regards the condition and offsetting of the crop.

St. Vincent.

The following reference to the establishment of the cotton industry in St. Vincent is extracted from the *Annual Report* on the island for 1903-4 :—

The great agricultural feature of the year has been the inauguration of the Sea Island cotton industry under the auspices and by the very active effort of the Imperial Department of Agriculture, under Sir Daniel Morris, K.C.M.G., with whom I have had the pleasure of being associated in this excellent work. The results are certainly encouraging. One hundred and thirty-six bales of excellent cotton, realizing from 4d. (this figure is for the Upland quality) to 1s 3½d. per lb. have been shipped from the colony since April last, and the present area in cultivation, from which the crop is being taken off at the time of writing [January 1905], is approximately 1,471 acres. With these prices, which, moreover, leave a fair margin for a fall, the industry should certainly pay and go some way in assisting to restore the colony's sorely shattered prosperity.

During the year a cotton factory of the most modern approved pattern, planned by the Imperial Commissioner of Agriculture after a personal inspection of many cotton estates in the Southern States of America, which he visited specially in connexion with the desired revival of this industry in the West Indies, was erected and equipped with six single-action Macarthy gins supplied by three different firms, with which the first experimental crop of Sea Island cotton was effectively handled.

Cotton Industry in the West Indies.

The following note on the prospects of the cotton industry in the West Indies appeared in the *Barbados Agricultural Reporter* of May 20 :—

The disappointment which the present state of the sugar market has caused to so many shows again the necessity there is of our devoting attention to the other industries that have recently been started in this island. The cotton fields have been a considerable help to many of the black soil estates during this season. Several planters have expressed themselves as quite satisfied with the return they have obtained, and are resolved to increase the acreage of their cotton in the fall of this year. The Duke of Marlborough, in a recent address to the Cotton Spinners' Association of Bolton, stated that there is every probability that within the next ten years the demand for cotton will be greater than the supply. He spoke in high terms of the work which Sir Daniel Morris has accomplished in the West Indies, and said that the Colonial Office now proposes to send out a cotton officer to West Africa to do there what Sir Daniel has done in these islands. We need not fear competition from Nigeria. We have been repeatedly told that no part of the world can produce Sea Island cotton superior to that, which is being produced in the West Indies, and that however great the supply of other kinds of cotton may be, there is always a special market for this variety of long-staple cotton.

EDUCATIONAL.

St. Vincent Agricultural School.

The following is an extract taken from the *Annual Report* on St. Vincent for the year 1903-4:—

An agricultural school was established under the auspices of the Imperial Department of Agriculture with imperial money in 1900.

There was an average of twenty pupils during 1903-4.

The institution is progressing satisfactorily and several of the lads trained there have recently, after completion of their course, found employment in useful agricultural work in St. Vincent and other adjacent colonies.

The total cost of the school's upkeep during the year was £655, of which £201 were spent on special work, such as a thorough painting of the entire building and out-houses to preserve the wood-work, and the installation of drains and gutters.

A beginning was made in the laying out and preparation of plots adjacent to the principal primary school buildings in the island as school gardens, to afford an opportunity to the young generation to acquire some knowledge of the rudiments of skilled agriculture.

School Gardens.

The following article on 'Garden schools in foreign lands' is clipped from the *Daily Mail* of October 18, 1904:—

If foreign nations are taking the lead of us in agriculture now, what will be the state of affairs in a generation or two? For many of them are teaching their children the science and practice of agriculture with the same care that they teach writing and arithmetic.

Sweden has had 'school gardens' for many years past, and their number now amounts to several thousand. Belgium, Switzerland, Austria, Germany, and France have all taken up the idea. Wherever it has been carried out the results are recognized as being most valuable, and people wonder that they did not think of it before.

It has been found that the children take up this study with great interest and with such success that they turn every little bit of ground at home to account and provide the family with vegetables. Taught the latest and best systems of agriculture, they develop into really intelligent agriculturists, and are ready, which we are not, to discard old and wasteful methods for the newest and best.

As an example of what is being done in this way, take the case of Belgium. Here, in the country districts, many schools have plots of ground varying in extent from an acre upward, where a thorough grounding in agricultural science is given. The younger children are taught the use of the spade, hoe, rake, trowel, and watering pot, together with such knowledge as suits their young minds regarding peas, beans, cabbages, potatoes, apples, pears, plums, strawberries, cherries, carrots, onions, parsley, and tobacco. This is easy and pleasant work compared with the sums, writing, and reading of the indoor school. Such young children, five years old and upwards, are also familiarized with the habits of a few of the commoner animals, the swallow, titmouse, sparrow, lark, finch, mole, hedgehog, caterpillar, butterfly, and May bug.

For older pupils the field is very extensive. They learn about the germination of seeds, the anatomy of plants, with the uses of their various parts—stem, roots, leaves, buds,

flowers, and fruit. They are shown how to plant slips, to plant flowers in pots, to graft, and to transplant. They are taught to lay out a small nursery, to prepare the ground, to sow seeds, and to care for the plants during their growth. The very important subject of fertilizers is fully explained, as well as the dangers from insects and the remedies. Then they learn how to gather seeds and how to keep them, and how to recognize poisonous plants. Gradually the whole science is unfolded. The pupils are taught the advantages and disadvantages of the various kinds of soils; how to use manure, and its virtues as compared with the various fertilizers; how to choose seeds, and the various methods of sowing them by hand, with tools, etc. As the plants grow they are practised in weeding, thinning, hoeing, hilling, etc., and the effects of the various operations are explained. Ploughing, harrowing, and rolling; harvesting hay, grain, turnips, potatoes, carrots; preserving the harvest in stacks, barns, and pits, are operations for the advanced student. At the same time he is made acquainted with the best knowledge concerning animals. The pupil learns all about drainage and irrigation, as well as meteorological phenomena—rain, mist, dew, ice, wind—from an agricultural point of view. Obviously, a boy who goes through a complete scientific training of this kind must make a better agriculturist than if he got his knowledge in the haphazard way of our own country. And this fact is proved by the great success of the Scandinavian farmer in America.

Girls, as well as boys, go through systematic training in the garden schools of foreign countries. They learn the qualities of a good laying hen, how to care for their fowls, how to treat milk, to skim it, churn it, and to make cheese, and also the use of the various instruments for testing the density of milk, the amount of its acidity, and the quantity of cream.



WEST INDIAN FISHERIES.

The following are extracts from official reports for 1903-4 relating to the subject of fisheries in the West Indies:—

ST. VINCENT.

A whale fishery is carried on in the St. Vincent Grenadines, notably Bequia and Canouan, and is a very material benefit to the inhabitants of those islands, whose condition compares favourably with that of the labourers of St. Vincent itself. The value of whale oil exported was £1,150 as against £1,107 in 1902.

LEEWARD ISLANDS.

There is no organized fishing industry in the colony, but an effort in this direction is being made by the government. Fish are caught for local consumption only, not for export, except in the Virgin Islands, whence fish are exported in considerable quantities to the neighbouring Danish island of St. Thomas.

The principal fish caught are the king-fish, barracouta, margate, mullet, snapper, cavally, lobsters, etc. Turtle are largely exported.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

VOL. IV. SATURDAY, JUNE 3, 1905. No. 82.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue discusses certain points of practical interest to cacao planters, briefly reviewing some of the efforts that have been made to improve the health and productiveness of cacao trees.

In the notes on the sugar industry references are made to signs of revival in Jamaica and the Leeward Islands. Excellent results obtained with some Demerara seedlings in Hawaii are recorded on p. 162.

The article on 'Garden schools in foreign lands' on p. 167 is likely to be read with interest. Every effort is being made throughout the West Indies to encourage the establishment of school gardens in connexion with elementary schools.

Interesting insect notes of local interest will be found on p. 170; these include references to the peculiar structure of some bees' nests, and to the uses of salt for the protection of grain against weevils.

On p. 173 there is published a detailed report by Mr. Lewton-Brain on a visit to the St. Vincent Agricultural School. Reference is made also on p. 167 to the useful work that is accomplished at this school.

Interesting information in regard to the growth and marketing of Broom Corn is published on p. 174. It would appear that while, under normal conditions, a profitable business is scarcely likely to be established between the West Indies and the United States, Canada offers a market for this product which might prove profitable.

Grape Fruit from Dominica.

An interesting experiment has recently been made in shipping grape fruit from the Botanic Station at Dominica to the Covent Garden market. The four boxes shipped were sold for £3 6s. The shipping expenses and freight amounted to 10s. 4d., and the sale charges to 6s. 10d. It will therefore be seen that the experiment was very satisfactory from a financial point of view.

It should further be stated that the four crates were the produce of four trees. The latter were budded in 1899 and bore fruits in 1902 and 1903. The profits mentioned above are particularly satisfactory when it is considered that the trees are less than six years old.

St. Lucia Agricultural Experiments Committee.

As was announced in the *Agricultural News* (Vol. IV, p. 91), at a meeting of the St. Lucia Agricultural Society held on February 22 last, a committee was, upon the suggestion of the Imperial Commissioner of Agriculture, appointed to confer with him with the object of promoting the sugar, cacao, fruit, and other industries of the island.

The following is a list of the gentlemen who have signified their willingness to serve on the Agricultural Experiments Committee:—

The Hon. E. duBoulay, the Hon. Granville Ponsonby, Messrs. S. Melville, E. G. Bennett, K.C., Hugh Hunter, C. R. Kennaway, R. G. McHugh, George Barnard, and the Agricultural Superintendent. Mr. G. S. Hudson, the Agricultural Instructor, is acting as Secretary of this Committee.

West Indian Bulletin.

The first number of Volume VI of the *West Indian Bulletin*, issued to-day, contains a further instalment of the papers read at the West Indian Agricultural Conference of 1905.

Useful information is given to show the present position of the cane-farming industry in British Guiana and Trinidad. This important subject was dealt with at some length at the Conference, as it was felt that some efforts were needed to put the industry on a satisfactory footing, more especially in Trinidad. Other papers in connexion with the sugar industry deal with the principal fungoid and insect pests of the sugar-cane, with the field treatment of cane tops for planting purposes, and with the establishment of a central factory at Antigua. Dr. Francis Watts also contributes a paper of a technical character dealing with the 'Polarimetric determination of sucrose.'

The remaining pages of the number are devoted to the cacao industry. It was the general opinion that a very useful discussion took place at the Conference in this connexion, and it will be found that a large amount of practical information in regard to efforts to improve the health and productiveness of cacao trees has been brought together.

It may also be mentioned that the index and title page for binding Volume V of the *West Indian Bulletin* is also issued to-day.

Agriculture in Colombia.

According to a recent *Consular Report* on the trade and agriculture of the Santa Maria district of Colombia, progress is being made in the district in agriculture, but its full extension is being prevented by a great scarcity of labour. Some attempt at immigration from the West Indies has been made.

Scarcity of labour is solely responsible for the non-extension of the coffee industry, excellent lands being available for the cultivation of this crop. The cultivation of bananas is steadily increasing. In 1902, when the prices for molasses and muscovado sugar for local consumption were high, the cultivation of sugar-cane was more than doubled; since then, however, with lower prices, the cost of cultivation remaining the same, many estates have been either abandoned or converted into banana cultivations.

The United Fruit Co. is conducting an experimental farm of cotton on a small scale. Excellent growth has been made, but the scarcity and high price of suitable labour will probably prevent the establishment of the industry on a large scale.

Cacao and tobacco are also grown, and attention is paid to the breeding and fattening of cattle. Irrigation being necessary in the cultivation of bananas, sugar-cane, and cacao, six rivers are utilized for this purpose. Some 10,000 acres of land are under irrigation in this way, and the acreage is being gradually extended.

The Supply of Nitrogenous Fertilizers.

The *Agricultural World* of May 6, 1905, deals with the subject of the predicted exhaustion of the supplies of artificial manures. At the present rate of consumption, which amounts to something like a million and a half tons a year, the vast deposits of nitrate of soda will probably be worked out in another twenty years. The problem of finding a way of replacing this from another source has been exercising scientists for some time. Five years ago Sir William Crookes predicted that a dearth of nitrogen for fertilizing purposes would be prevented by the extraction of this element from the atmosphere.

As has already been mentioned in the *Agricultural News* (Vol. III, pp. 279 and 343), the process indicated by him has taken definite shape, and a new fertilizer—calcium cyanamide—is now available.

According to recent information, it appears that in addition to the existing plant for the manufacture of cyanamide near Berlin, a large factory is to be erected near Turin, capable of turning out each year 40,000 tons of another fertilizer prepared from the atmospheric nitrogen, viz., nitrate of lime. Other factories are being arranged for in South Germany where there are cheap supplies of water power. In France a material known as 'nitrated lime,' containing 15 to 20 per cent. of nitrogen, is being manufactured from the atmosphere. When applied to the soil it is said to be transformed into ammonia and to have a high fertilizing value closely approaching that of nitrate of soda or sulphate of ammonia.

Exports of St. Vincent

According to the *Annual Report* on St. Vincent for 1903-4, from which extracts are given elsewhere in this issue of the *Agricultural News*, the general condition of the island during the year has been one of slow but gradual recovery after the experience of the previous ten months. The total value of the exports was £38,174 as against £44,094 in the previous year.

Taking the principle exports individually, however, it is seen that in nearly every case the value shows some increase over that of the previous year's export. The exceptions are sugar, the value of which fell from £6,034 to £2,819; rum, £1,150 to £28; and live stock, £4,353 to £2,682. On the other hand, satisfactory improvement is shown in connexion with several of the minor industries. For example, cacao shows an increase from £1,558 to £2,155; vegetables, £1,292 to £1,329; whale oil, £1,107 to £1,150; cotton, £561 to £900; cassava starch, £485 to £921.

The exports of arrowroot, which is the principal article of export, were of the value of £21,686 as against £21,817 in 1902.

Experiments with Rat Virus.

In a previous issue of the *Agricultural News* (Vol. IV, p. 53) mention was made of the 'Liverpool' virus for the destruction of rats and mice. It was stated then that a supply of these cultures was being obtained by the Imperial Department of Agriculture for trial in the West Indies. A small supply of tubes containing the cultures was received in April last and distributed for experiment in Antigua, Dominica, and Barbados.

In Antigua bread and corn were infected: part of this was used at the Government Laboratory, part at the Royal Mail Office, and part was sent to Mr. H. Goodwin, M.R.C.V.S.

At the laboratory a dazed and lethargic rat was observed, and in a few weeks it was noted that rats were less numerous. At the Royal Mail Office, also, rats have been less troublesome and appear to be less numerous.

Mr. Goodwin has sent in a very complete report. He distributed part of the inoculated material to three estates: in each case it was reported that in a few weeks rats appeared less numerous and that the destruction due to them was greatly reduced. Mr. Goodwin also experimented with rats in captivity. These experiments show clearly the strength of the virus and the infectious nature of the disease communicated by it. A mungoose and chickens, fed on the flesh of rats killed by the disease, showed no effects. Mr. Goodwin recommends that the infected material be placed in different parts of an estate or property, in order to reach the different colonies of rats.

In Barbados the results also appear to be favourable to the virus. Few dead rats are seen, but their depredations are noticeably reduced.

A fresh supply of the virus has recently been received and distributed for further experiment.



INSECT NOTES.

Destruction of Weevils.

The following note from the Queensland *Agricultural Journal* of April 1905 may prove of interest to readers of the *Agricultural News*. The directions given appear to be worthy of trial:—

Salt is a protective agent. This was accidentally discovered by a farmer. He stacked up some grain in an odd lot of sacks, some of which had contained salt. When the grain was marketed, that in the salt sacks was perfectly free from weevils, that in the other sacks was riddled by them. He always used salt after this in his barn. When the unhusked corn was piled up in the barn, he dissolved a quart of salt in 2 gallons of water, and sprinkled the corn as it was thrown in. No weevils touched it, although the barn was previously full of weevils.

The Nasal Fly of the Sheep.

In the *Agricultural Gazette* of New South Wales, of April 3, 1905, Mr. W. W. Froggat, the Government Entomologist, records the occurrence of this fly (*Æstrus ovis*) and gives the following brief outline of its life-history:—

The fly, unlike the true bot-flies, is viviparous, depositing not eggs but maggots inside the nostril of the sheep, which are furnished with segmental spines and hooks on the head, admirably adapted for progression through the soft tissue and along the mucous membrane. They make their way up into the frontal sinuses of the head, where they develop to the full size, and then crawl down into the nasal cavities, and are sneezed out by the unfortunate host. The larvae hide in the ground for about a month before the perfect fly comes forth.

This insect is known to occur in the West Indies, but is not frequently reported. It is possible that it may be of more common occurrence than is generally supposed. It would be useful to have collected and sent to the Head Office specimens of flies found about sheep, or of maggots from the heads of slaughtered sheep or found on the ground where sheep are feeding.

Some peculiar Bees' Nests.

Among the Hymenoptera, that group of insects which includes ants, bees, wasps, etc., are to be found many habits of interest to every observer. Among these habits nest building is one of the most prominent, as many of the different bees' and wasps' nests occur in places where they are easily seen. The mud daubers, or mason bees, as they are called in the West Indies, furnish interesting examples of mud nests, which are to be found in sheds and other buildings, while the wild bees, Jack Spaniard and others, build a variety of paper nests. These latter, builders and inhabitants of paper nests, are the social wasps, while the

former, builders of mud nests, are solitary wasps. Among the true bees we find both solitary and social habits; the honey bee furnishing a good example of the social bee, and the leaf-cutting bee a good example of the solitary bee.

Among the leaf-cutting bees there is to be found a great variety of nests. One genus of this group, *Megachile*, which is represented in the West Indies, has some species that are true leaf-cutters and others that use mud in the construction of their nests. It may be interesting to refer to the nest-building habits of two common West Indian species. *Megachile flavitarsata* makes its nests of pieces of leaves neatly cut out and so fastened together as to form a tubular nest in which several cells are made by means of transverse partitions. The leaves of the rose, the *Cassia Fistula*, and the silk cotton are used for the purpose. *Megachile martindale* makes its nest of mud, generally inside some tubular cavity. The centre of a roll of cloth in a store-room, the base of a corn leaf, the rubber tubing and metal taps in laboratories, etc., are all used for this purpose. A cavity about $\frac{1}{2}$ inch to $\frac{3}{8}$ inch in diameter is usually chosen, and this is lined with a layer of mud, the inside of this lining being covered with a delicate waxy substance which makes the inside of the nest very smooth. These nests are stored with the pollen of flowers on which the larva of the bee probably feeds.

In distilleries, refineries, or sugar works, when any tubing or any taps or faucets are to be left unused for any length of time, much annoyance or even damage would be avoided if each opening were lightly plugged with cotton or fine straw, thus preventing the entrance of the bees.

LIBERIAN COFFEE.

The following note on Liberian coffee is extracted from the U. S. *Monthly Consular Reports*:—

Liberian coffee is considered by experts to be one of the best qualities of coffee. It is used in the great coffee markets to strengthen and give flavour to the weaker kinds. But for the Liberian coffee contained therein, many of the popular brands would be without that delicious flavour which commands for them such wide markets.

A few years ago, when the *Hemileia vastatrix* wrought such havoc among the coffee trees of Ceylon, India, Java, and Brazil; Liberian plants, because of their ability to resist the attacks of the pest, were used to replace the old trees.

Until about 1896, Liberian coffee commanded from 18c. to 22c. per lb. in the markets of the world, and large and flourishing coffee farms sprang up. But following the simultaneous large-scale production of coffee in Ceylon, India, Java, Brazil, and other places in West Africa, under the latest improved methods of cultivation, and with the best machinery for hulling and the final grading, there came a disastrous decline in the price. It commands now from 5c. to 8c. per lb. Large coffee farms are often abandoned to woods. Yet, possibly, the price of Liberian coffee would rise if the coffee farms were placed under scientific cultivation; if, through washing, or other processes, the beans were made to lose a certain bitterness objectionable to some; if the coffee were presented to market in better condition by grading; and if there were substituted the best and most improved hulling machinery for the crude pestle and mortar which break many beans. As it is, with better and more general advertising in the United States, the real and distinctive merits of the Liberian coffee would lead many Americans to avail themselves of one of the best coffees of the world.



RAINFALL RETURNS.

Jamaica.

The ‘annual summary for 1904’ of the *Monthly Weather Review* of the U. S. Department of Agriculture Weather Bureau gives the following rainfall returns for Jamaica, from about 129 average stations, supplied by Dr. H. H. Cousins:—

Month.	Rainfall Divisions.				The Island.
	N.E.	N.	W.C.	S.	
January ...	5·88	2·60	3·01	2·17	3·42
February ...	8·45	4·19	3·13	2·86	4·66
March ...	6·07	3·18	11·37	6·74	6·84
April ...	4·11	4·18	10·26	5·10	5·91
May ...	6·91	7·33	9·55	6·26	7·51
June ...	18·27	11·61	17·62	13·31	15·20
July ...	5·71	2·34	5·77	3·21	4·26
August ...	7·02	3·25	7·73	3·88	5·47
September ...	5·66	3·89	9·98	6·42	6·49
October ...	19·38	9·42	19·41	18·12	16·58
November ...	17·81	8·60	3·16	1·92	7·87
December ...	6·85	3·13	3·41	2·36	3·94
Total ...	112·12	63·72	104·40	72·35	88·15

St. Vincent.

The following remarks are made upon the rainfall for St. Vincent in the *Annual Report* for 1903-4:—

The rainfall for the year 1903-4 was 100·45 inches, as against 108·37 in 1902.

Rain fell on 261 days throughout the year.
The maximum fall in one day was 5·25 inches, on December 19.

October was the wettest month with 19·84 inches, and February the driest with only 2·97 inches.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned from an official visit to Tobago in C.L.S. ‘Oruro’ on May 28 last.

Mr. L. Lewton-Brain, B.A., F.L.S., returned from an official visit of inspection of the Agricultural Schools at St. Lucia and Dominica in R.M.S. ‘Eden’ on Saturday, May 20.

Mr. Rudolph D. Anstead, B.A., the newly appointed Agricultural Superintendent of Grenada, embarks for that island on Monday, June 5.

AGRICULTURE IN SURINAM.

In his opening speech to the Legislative Assembly of Dutch Guiana on May 9, the Governor spoke at some length on the agricultural position of the colony. After speaking of the serious decline in the output of cacao on account of the ravages of the ‘witch broom’ disease, he said:—

We may reasonably look for better results in the current year. This is encouraging, but we can hardly venture to assume that the disease will be eradicated within a few years. The Department of Agriculture is trying to combat the disease. Under the most favourable conditions the results of these experiments can only be known a few years hence.

The greater number of the plantations are already in want of money. Unless the combating of the disease takes a favourable turn, those plantations can only be saved if means be found to increase their income within a short time. The remedy, it appears to me, might lie in the calling into existence of a banana culture for export. The sugar industry, owing to fair prices, had a good chance in 1904. Work was carried on profitably on all the plantations, in spite of the damage to the canes by the prolonged drought, especially in the Nickerie district.

As regards agriculture, we may mention as a cheering sign the establishment of the enterprise for the growing of fibre-yielding plants. At the end of 1904, the fibre-cleaning plant was put up, and some 60 hectares planted with the sisal agave. On some plantations a beginning was made with the growing of Hevea, and rice planting, especially on small farms, underwent a noticeable extension. The rice production, which in 1903 amounted to about 450,000 kilos, increased in 1904 to about 850,000 kilos. When we consider, however, that the annual importation amounts to 5,000,000 kilos, it appears that rice culture can still undergo a vast extension before the consumption will be covered by the production.

IMPORTED STOCK AT ST. LUCIA.

The following extract is taken from the monthly report of the Agricultural Instructor at St. Lucia, dated May 22, 1905:—

On May 14 I inspected the Arab stallion at ‘Cap’ estate, imported by Mr. Charles Henderson from Lady Blount’s Arab Stock, and was also shown the pedigree. Its height is 14·2, and it seems a perfect animal in every respect. Mr. Henderson is asking £5 as a stud fee from the general public, but consented to take \$10 on mares approved by the Department’s officers or the Agricultural Society. I also inspected a Shorthorn bull and cow, and an Ayrshire cow imported from England, and some water-boring machinery.

Rabbits in the United Kingdom. One of the most interesting items in connexion with the meat imports is that of dead rabbits. In this country rabbits are an article of food to a much greater extent than in the United States. Rabbits are cheap and are considered to be both nutritious and digestible. They are a standard article of food among the people. In 1903, 53,273,240 lb. of rabbits, of a value of \$3,552,767, were imported into this country. Australia alone sent last year rabbits to the value of \$1,348,000. In a lecture recently delivered by one of the commercial agents of Australia it was stated that the great Australian pest of rabbits has been alleviated, to some extent, owing to the fact that it was possible to ship them to England. (U.S. *Monthly Consular Reports*.)



GLEANINGS.

The shipment of cotton from Antigua by last mail amounted to 41 bales. The total weight of cotton was 7,356 lb.

It is proposed to hold an agricultural show under the auspices of the Imperial Department of Agriculture at Roadtown, Tortola, in the month of September next.

In the years 1902 and 1903 the numbers of pine-apples exported from St. Michael's, Azores, were 940,382 and 939,638, respectively. These were shared by London and Hamburg.

It is requested that specimens of cotton (lint) forwarded to the Head Office of the Imperial Department of Agriculture for examination and report should weigh not less than 4 oz., irrespective of the wrapping.

The stallion 'Jamaica Lad' lately attached to the Dominica Agricultural School has been loaned to Montserrat for a time. For the present his services will be available at Paradise at the charge of 4s.

The Toffenburg goat 'Pauline' imported into Barbados in 1903 by the Imperial Department of Agriculture has recently given birth to three male kids. Since the kids were weaned 'Pauline' has given an average of 7 pints of milk daily.

Of the thirty-eight candidates who sat at the examination in agricultural science held throughout Berbice on March 25 last, fourteen obtained certificates, while twenty-four failed to satisfy the examiner. (*Demerara Argosy*.)

Mr. Frank Cundall, Secretary of the Institute of Jamaica, was expected to proceed to England by the S.S. 'Port Kingston' on May 25, for the purpose of representing the colony at the Colonial and Indian Exhibition at the Crystal Palace.

It is announced in the *Trinidad Royal Gazette* that the Governor directs that in future cacao shall be described in shipping bills by reference to its place of origin. This step has been taken with the view of preventing the exportation of imported cacao as Trinidad cacao, thereby causing harm to the industry.

Indian Planting and Gardening mentions that a new use has been found for the Talipot palm (*Corypha umbraculifera*). Buttons have been made from the seeds, which, in their prepared form, resemble vegetable ivory. As the palm bears a larger number of these seeds a good business might be done.

In view of the presence of fungoid diseases in pine-apples in some districts of Antigua, the Imperial Commissioner of Agriculture recommends that no suckers be imported from that island for cultivation in other parts of the West Indies until further notice.

In reference to the note in the *Agricultural News* (Vol. IV, p. 121) on the West Indian onion trade, it may be mentioned that the Agricultural Instructor at Tortola has sold the onions raised at the Experiment Station to a merchant in St. Thomas at 11s. per 100 lb.

According to the *Port-of-Spain Gazette*, the factories in the southern district purchased 71,000 tons of farmers' canes this year at a cost of £49,700. The increased rates—5s. a ton—paid for canes this year over last season, placed the appreciable sum of £17,750 more in the pockets of cane farmers down south.

We are very glad to learn that the Government is able at last to lay before the Council a bill dealing with praedial larceny. This class of crime, which is rife in certain districts, has checked planting enterprise, and all the agriculturists of the island will rejoice at the prospect of the evil being grappled with. (*Dominica Guardian*.)

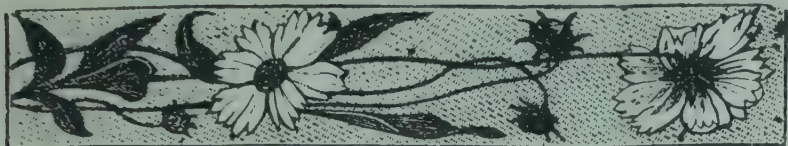
According to the United States Consul-General at Marseilles, the principal centre of the oil-nut trade, African nuts, though richer in oil, are inferior to the American for comestible purposes. The Virginia nut is said to be the finest in the world, but it is not so advantageous as a producer of oil.

It may be mentioned that, with a view to preventing the introduction of disease with cacao pods from one island to another (as for example from Dominica to Nevis), the Imperial Commissioner of Agriculture has given directions that in all such cases the pods shall be steeped in Bordeaux mixture previous to shipment. Further, the empty shells should afterwards be buried with lime.

According to the *Consular Report* on the trade of Texas for the year 1904, there were exported during the year 210,114 tons of cotton seed cake and meal, valued at £980,933, in addition to 1,902,745 bales of cotton of the value of £21,402,736. Nearly half the exports of cotton went to the United Kingdom, but most of the cotton seed meal was shipped to Germany.

A supplement to the *Jamaica Gazette* contains a memorandum by the Island Chemist, summarizing the operations during the year ended March 31, 1905, under Law 45 of 1903—a Law to provide for the establishment and maintenance of a Sugar Experiment Station. Twenty qualified distillers have applied for permission to attend a special course of instruction on distillation in August next.

A specimen of sugar-cane has been received at the Head Office from Dr. Watts showing interesting variation. The lower joints (six) show well-marked purple stripes; the next three or four joints show traces of the purple stripes, while the remaining upper joints are entirely devoid of markings. A similar specimen having already been received, a drawing of it is on record.



ST. VINCENT AGRICULTURAL SCHOOL.

The following is a report, dated May 12, 1905, by Mr. L. Lewton-Brain, B.A., F.L.S., on a visit of inspection of the St. Vincent Agricultural School:—

I have the honour to submit, herewith, a report on my visit to St. Vincent, from the 3rd. to the 5th. instant, for the purpose of inspecting the Agricultural School in that island.

BOOKS AND RECORDS.

I examined the books kept by the Resident Master, including the Students' field book (with record of marks), Diary, Admission book, etc. These books all appear to be kept well up to date and in good order.

I also examined the books kept by the pupils, with records of their work in class and in the field. Generally speaking, these books are satisfactory, though, naturally, some of those belonging to the more junior pupils are not so clean and neat as the others. Even these, however, show distinct improvement in the later entries.

I inspected a series of weekly examination papers set by the Resident Master. These are of interest as showing a distinct and steady, though in some cases slow, improvement in the work done by the pupils.

BUILDINGS.

I went through and inspected all the buildings, including the dormitory, school room, class room, tool-shed, store, and lecture room. Cleanliness and good order appeared to be the rule everywhere.

LIBRARY.

The library appeared to be kept in good order, and it is readily accessible to the pupils. Mr. Patterson however, informed me that the boys do not make as much use of the books as might be desired. The publications of the Department were well in evidence. Bound volumes of the pamphlets, from 1900 to 1903, would be desirable additions.

CLASS ROOM.

The supply of chemicals and apparatus is sufficient for present requirements.

MODEL LESSONS.

According to your instructions, I requested the Schoolmaster to prepare a geography lesson on the West India Islands, their products, means of communication, etc. The lesson was given on the following day. The boys have a marked habit of answering simultaneously which should be eradicated: it will be impossible otherwise to detect and work up the more backward students. The more individual the teaching the better. Again, the master should not stand behind the class while giving a lesson, as in this way, he would be very apt to lose his grip on the attention of the pupils. The discipline was good and the lesson fairly well arranged.

Mr. Patterson, the Resident Master, also gave a model lesson in my presence; his subject was the form and general external features of leaves. The lesson was in the form of a practical demonstration: each pupil received specimens of the leaves and was made to draw them himself. Lessons such as this are excellent for training the powers of

observation. The attention and discipline of the boys were both good.

VIVA VOCE EXAMINATION.

I questioned the boys thoroughly on different subjects. The older pupils answered intelligently and accurately. The newer boys also answered brightly for the most part, and should do well with further teaching; one of them, McConney, is exceptionally bright, and is a very promising pupil. The others are of more average abilities.

DISCIPLINE.

Generally, the tone of the school is very good, and Mr. Patterson appears to have the boys well in hand. The work, both outdoor and indoor, appears to be progressing in a satisfactory manner.

There are, at present, nineteen boys at the school, of whom two, Yorke and Longheed, will complete their term in September of this year.

INTERNATIONAL ASSEMBLY FOR COLONIAL AGRICULTURE.

A national exhibition of colonial agriculture will be held in the Jardin Colonial at Nogent-sur-Marne, near Paris, in June and July next, under the patronage of the Minister for the Colonies and Agriculture, at which all the French colonies will be represented. It is suggested by the French Society for Colonial Agriculture, which is organizing the exhibition, that it might be made the occasion of an international assembly devoted to the study of colonial products and their culture, for the furtherance of which the society claims to be the only European scientific society.

With the view of making the proposal to hold an international assembly as widely known as possible, the Imperial Commissioner of Agriculture has been requested to give publicity to its aim and objects. The programme of subjects to be dealt with corresponds exactly with the programme of the exhibition, which is as follows:—

- | | |
|-------------|--|
| Class I. | Products of the soil. |
| Class II. | Live stock; animal products; useful and noxious insects. |
| Class III. | Forest products. |
| Class IV. | Agricultural implements and machinery. |
| Class V. | Products of colonial industries, including sugars, spirits, starches, oils, gums, rubber, etc., etc. |
| Class VI. | Human and veterinary hygiene, including filters, mosquito protections, serums, etc. |
| Class VII. | Publications, statistics, etc. |
| Class VIII. | Fine arts. |
| Class IX. | French and colonial horticulture. |

Sisal Hemp in Mexico. The exports of fibre consisted principally of henequen and manufactures thereof. The amount of fibre exported in 1903 amounted to 95,700 tons, as compared with 85,691 tons in 1902. The manufactures, consisting principally of hammocks and cordage, amounted to 3,211 tons, while in 1902 their weight only represented 2,395 tons. Their total value was £3,037,137 as compared with £2,946,900 in 1902. Henequen is sent to the United States and Cuba. The manufactures are also exported to the United States, and a very small quantity to Guatemala and Cuba. (*Consular Report on Mexico for 1903.*)

BROOM CORN IN THE WEST INDIES.

Experiments conducted at Antigua some two or three years ago by Mr. W. N. Sands, then Curator of the Botanic Station, showed that broom corn could be successfully grown in the West Indies. An interesting paper was read by Mr. Sands at a meeting of the Antigua Agricultural Society, a summary of which was published in the *Agricultural News* (Vol. II, p. 142). This paper contains useful hints as to the cultivation of the corn and the preparation of brushes. Broom corn has since been grown at Montserrat.

With the view of ascertaining what demand exists for broom corn in the United States and Canada, inquiries were addressed by the Imperial Commissioner of Agriculture to Messrs. Gillespie Bros. & Co., of New York, and Mr. J. Russell Murray, of Montreal, samples of broom corn, produced in Montserrat, being forwarded at the same time. The report of Messrs. Gillespie Bros. & Co. was to the effect that the United States produce broom corn far beyond their own requirements and that it is only in the event of a shortage in the crop that the United States need to become buyers. It is further stated:—

The most expensive and toughest kind of broom corn is that grown in Illinois, which is worth from \$90 to \$100 per ton out there. The cheaper quality, grown in Oklahoma and Kansas, can be bought at about \$20 per ton on the spot, and costs, laid down in New York, about 3½c. per lb.

Broom corn is on the free list, and is therefore exempt from duty on being imported into New York, but we fear that the low price indicated . . . will make the business one hardly likely to be profitable in the West Indies.

We may add that the broom corn used here is all dyed of a bluish-green colour, which is regarded as necessary in the trade.

The sample corn seems to be of good quality and fibre, but we notice considerable stained or sweat corn, and the seed would all have to be taken off at the time it was harvested. It is worth about 3½c. to 4c. per lb. in New York. These prices would be in car-load lots.

From Canada, however, a rather more encouraging report has been received. Mr. J. Russell Murray considers that Canada offers a better market for this product. His report is as follows:—

The quality of the sample sent is considered very good. The only feature that did not conform to what is required as a commercial product was the quantity of seed that appeared on several of the stems. For general commercial purposes it is usually considered that 90 to 95 per cent. of the fibre must be clear of seed; and the stalks were cut too short, it being the usual practice of the trade to allow 6 to 8 inches of stalk to remain with the head.

As regards the trade itself, there is ample room for considerable shipments to Canada direct. Canada does not produce any broom corn, and it is all supplied from the western section of the United States, and is imported into Canada free of duty.

There are various grades of the product: The small dwarf, which is used for hand brushes; a second grade which is used for covering the brooms, and a third and coarser grade which is used for making up the body of the brush. The prices for these grades vary considerably. The finest, or dwarf brooms, obtain as high as 25c. per lb. In well-

selected dwarfs, a species of which is hereby sent by mail, please note the general fineness of the fibre, and you will also note that fully 4 inches of stalk are allowed to remain; this might with advantage be extended to 5 inches. The next grade is what is called 'Self working.' These are composed as per sample attached, and have stems of fully 5 to 6 inches remaining, and in the finer grades 7 inches are not a drawback. This class can be divided into two grades—the heavy, coarse piece being valued at about 3½c. per lb., while the smaller piece is worth from 5c. to 7c. per lb. But, taken as a whole, in what is contained in the 'Self working' bales, prices run about 5c. per lb. In this class the entire lengths must be from 18 to 30 inches. The bales are usually put up to weigh about 300 lb., and are sold on the gross weight, wire bindings included.

The third three pieces enclosed are what we call 'Red tipped.' This is a species of rust, the origin of which the manufacturers are unable to give any information about. You will notice that in this lot some of the stems are considerably longer, but these are all of service in manufacturing. The red rust or staining is a very great drawback, and all classes of stain and weather damage should be most carefully avoided. In connexion with faulty stems, it was pointed out to me that frequently the plant was blown down in the Western States, and it finally raises its head, causing the bending of the fibre. This is a decided drawback, and all such should not be shipped, as it detracts very considerably from the value of the bale in which it is found. The entire trade of the broom corn seed is under the influence of a trust in the United States, and it is stated here that this trust has complete control of the supplies during the next two years. The consumption here amounts in value to several hundred thousand dollars for the raw product. I will endeavour to ascertain the actual importation and forward the same to you by next mail.

Should there be any stock of this available for shipment as a trial parcel, I shall be exceedingly pleased to look after its interest here, as I am assured that I shall meet with prompt purchasers as soon as it comes forward. There are no duties payable on this product.

A NEW CACAO DRIER IN TRINIDAD.

The following is a description of a patent cacao-drying apparatus erected by Mr. Hoadley at Chaguanas, Trinidad:—

The cacao-drying apparatus consists of an ordinary room, 34 feet square, with 25 feet perforated circular drying floor, upon which cacao is placed direct from the fermenting box. In the centre of the drying tray is a vertical axle from which project four arms which are revolved once in ten minutes. To each arm are attached six ploughs, the operations of which are equal to the work of twelve coolies in keeping the cacao in constant motion. Hot air is generated by exhaust steam, which is passed into 1,100 feet of piping enclosed in a box, over which cold air is drawn by a powerful fan which makes from 600 to 700 revolutions per minute. The air in its passage becomes heated to any desired point up to 150° and is forced up through the drying floor. The machine will dry from 12 to 15 bags of cacao in thirty to thirty-six hours. The cost of installing the system is said to be between £300 and £400.

After drying, the cacao is passed through a machine which clays and polishes, or merely polishes to suit the markets, and thereby saves the costly process of dancing. The cacao is fermented in cylindrical drums, which are partially turned every night and morning for ten to eleven days.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice markets for the month of April:—

The occurrence of the Easter holidays in the month of April has gone far towards the disorganization of the drug and spice markets, though in the earlier part of the month, in anticipation of the curtailment of the sales over the holiday season, a somewhat greater interest was shown in the offerings of both new and old goods.

The principal items of interest to West Indian readers are as follows:—

GINGER.

At the spice sales on April 5, there was a fair competition for Jamaica at somewhat increased rates, 270 barrels selling at 37s. to 39s. for middling to fair bright, and 32s. to 38s. for good common. Cochin and Calicut were offered to the extent of 400 packages, twenty only of which were disposed of, common wormy rough being sold without reserve at 15s. 6d. Bold selected cut Cochin was bought in at 80s., very small cut at 27s., fair washed rough at 22s., and good bold rough Calicut at 25s. A week later 193 barrels of Jamaica were offered and sold at the following prices: fair washed, 37s. to 38s. 6d.; bold, 36s.; and common to good, 30s.; no Cochin or Calicut was offered. On the 19th., there was a largely increased demand for Jamaica at higher rates; some 660 packages were offered and about 420 sold at from 1s. to 2s. per cwt. advance on previous rates, and in some cases it was stated that as much as 8s. increase was paid. The following are the actual prices realized: good, 44s. to 48s. 6d.; good common, 33s. to 37s.; common to fair common, 29s. 6d. to 32s. 6d. At the same auction the quotations for Calicut were as follows: brown rough, 19s.; slightly wormy, 17s.; brown tips, 18s. 6d. to 19s.

ARROWROOT, MACE, NUTMEGS, AND PIMENTO.

Of arrowroot, at the first sale on April 5, no West Indian was offered, and 60 cases of Natal were bought in. On the 12th., 480 barrels of St. Vincent were offered, and 200 sold at 1½d. per lb. for good manufacturing. Mace began the month with lower quotations than those of the preceding month, and but little or no change occurred later. West Indian nutmegs realized steady prices at the sale on the 5th., slightly declining a week later and remaining stationary for the rest of the month. Pimento began at steady to slightly lower rates, about 600 bags being offered, comprising ordinary and fair mixed blacks at 2½d. to 2¼d., and fair at 2¼d. to 2⅜d. per lb. There were but very slight variations in these rates for the remainder of the month.

SARSAPARILLA.

At the first drug auction on the 6th. the stock of true grey Jamaica was reported as very low indeed, consisting, it was said, of 4 bales only; 1s. 7d. per lb. was the price asked, and 1s. 1d. for Lima. Later in the month 16 bales of genuine grey Jamaica were offered and disposed of at lower rates, namely, 1s. 2d. to 1s. 4d. for fair sound, and 1s. 2d. for sea-damaged. Good bright Lima-Jamaica, of which 12 bales were disposed of, realized 11d. to 11½d., and for 1 bale of fine bright-red native Jamaica 1s. was asked, an offer of 10d. being refused. But little or no change occurred in these prices at the end of the month.

TAMARINDS.

Of tamarinds the first arrival of the new crop of Barbados was reported at the beginning of the month as being held at the very high figure of 15s., and a few second-hand parcels of fair Barbados were offered at 10s., while white stony Antigua were quoted at 9s. At the last sale of the month fair Barbados were quoted at 13s. 6d. per cwt. duty paid.

ANNATTO, KOLA, MUSK SEED, ETC.

On the 13th., 9 bags of bright Jamaica annatto seed were disposed of at 6¼d., while 3 bags of dull Ceylon fetched 1d. per lb. Dull West Indian kola was also disposed of at the same sale at 4½d., and 24 puncheons of common raw West Indian lime juice were sold without reserve at 4½d. to 5d. per gallon. Four packages of West Indian musk seed, described as of poor flavour, were disposed of at 2d. per lb.

New York Imports.

The following remarks upon the imports into New York of certain tropical products grown in the West Indies are extracted from the report of Sir Percy Sanderson, Consul-General in New York, for the year 1904:—

CACAO.

There is an increase in both quantity and value in the imports of cacao and cacao shells. The trade shows a steady increase, and about 33 per cent. comes from the British West India Islands. Suggestions are made that the cultivation should be encouraged in Porto Rico.

COFFEE.

The increase in the quantity of coffee imported amounts to about 15 per cent., while the value of the imports of this article has risen by over 40 per cent. The principal supply is derived from Brazil, and South and Central America, a certain amount being also regularly imported from the East and West Indies. During the year 1904 the imports from most sources increased; those from France were larger than they have been hitherto, representing probably, in a large measure, Brazilian coffee from Havre. It has lately been suggested that a duty be imposed on coffee as a revenue measure and also as an inducement to the Philippine Islands and Porto Rico to turn their attention to the production of this article in preference to tobacco and sugar, in which they compete with American interests.

BANANAS.

There has been a decrease in the value of bananas imported from the British West Indies, and an increase, but to a somewhat less extent, in those brought from Cuba and Central America.

SPICES.

The greater part of the trade in spices is with the British East Indies which supply about 50 per cent., the Netherlands furnishing about 12½ per cent., the United Kingdom and the British West Indies about 10½ per cent. in each case. The imports show a decrease in quantity, more particularly in pepper, while prices have been slightly lower.

SUGAR.

There was a large increase in the importation of cane sugar, chiefly from Cuba and the East Indies. Imports from Germany increased, while those from the British West Indies diminished.

MARKET REPORTS.

London,—May 9, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' April 20; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 5, 1905; and 'THE PUBLIC LEDGER,' May 6, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 13/- to 45/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
 BEES'-WAX—£7 10s. to £7 15s. per cwt.
 CACAO—Trinidad, 56/- to 61/- per cwt.; Grenada, 53/- to 54/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
 COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—4/- to 5/- per bunch.
 GRAPE FRUIT—5/- to 6/- per case.
 ORANGES—8/- to 10/- per case.
 PINE-APPLES—Antigua, 15/- to 17/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, middling to fair bright, 42/6 to 47/-; ordinary to good ordinary, 32/- to 37/- per cwt.
 HONEY—16/- to 28/- per cwt.
 ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 1/- to 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £14 10s. to £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/5 to 1/6 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Good pale, 1/6 to 1/8; fair pale, 1/3; red, 1/1 to 1/2; broken, 11½d. to 1/- per lb.
 NITRATE OF SODA—Agricultural, £11 5s. per ton.
 NUTMEGS—63's to 64's, 1/4 to 1/6; 76's, 1/-; 82's, 9½d.; 98's, 8d. to 8½d.; 120's, 5½d. per lb.
 PIMENTO—2½d. to 2½d. per lb.
 RUM—Demerara, 1s. 2½d. to 1s. 4½d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.
 SUGAR—Yellow crystals, 18/- to 20/- per cwt.; Muscovado, Barbados, 19/- to 19/6 per cwt.; Molasses, 13/- to 17/- per cwt.
 SULPHATE OF AMMONIA—£12 13s. 9d. to £12 15s. per ton.

Montreal,—May 9, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 35c.; Antigua, 30c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 19c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5c. to 5½c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey crystals, 96°, \$3.10 to \$3.35 per 100 lb.
 —Muscovados, 89°, \$2.43 to \$2.50 per 100 lb.
 —Molasses, 89°, \$2.00 to \$2.25 per 100 lb.
 —Barbados, 89°, \$2.10 to \$2.30 per 100 lb.

New York,—May 12, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.
 COFFEE—Jamaicas, 8½c. to 9c. per lb. (ex store).
 GINGER—Jamaica, 6½c. to 6¾c. per lb.
 GOAT SKINS—Jamaicas, 57c. to 60½c. per lb.
 GRAPE FRUIT—Jamaicas, \$5.00 to \$6.00 per barrel.

HONEY—39c. to 41c. per gallon.
 MACE—West Indian, 30c. to 34c. per lb.
 NUTMEGS—West Indian, 110's, 14c. 80's, 21c. per lb.
 PIMENTO—4½c. per lb.
 PINE-APPLES—\$1.50 to \$2.50 per case.
 SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3¾c.; Molasses, 89°, 3¾c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 17, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—24c. per gallon, package included.
 SUGAR—89°, \$2.20 per 100 lb.

Barbados,—May 20, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

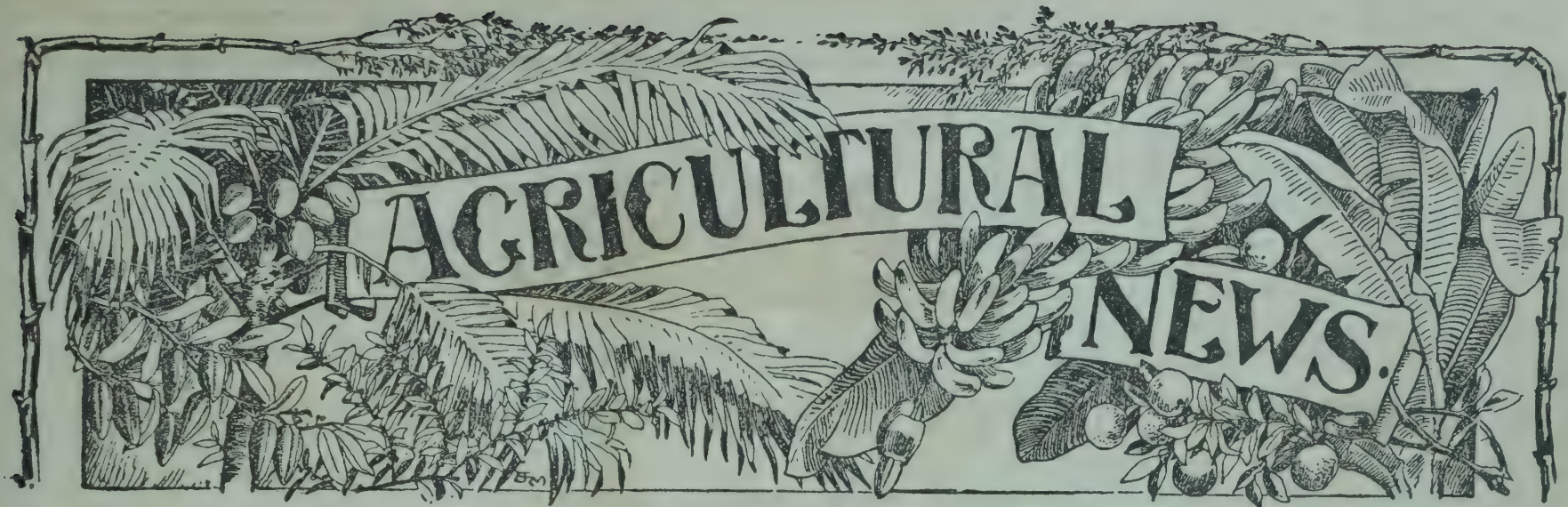
ARROWROOT—St. Vincent, \$3.40 to \$3.60 per 100 lb.
 CACAO—Dominica, \$12.50 to \$13.00 per 100 lb.
 COCOA-NUTS—\$15.00 per M. for husked nuts.
 COFFEE—\$10.50 to \$12.00 per 100 lb.
 HAY—\$1.05 per 100 lb.
 MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$60.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 MOLASSES—22c. per gallon.
 ONIONS—Madeira, \$2.62 per 100 lb.
 POTATOS, ENGLISH—\$1.75 per 160 lb. (retail).
 RICE—Ballam, \$4.40 per bag (190 lb.); Patna, \$3.25 per 100 lb.
 SUGAR—Muscovados, 89°, \$1.90; Dark crystals, 96°, \$2.70 per 100 lb.

British Guiana,—May 18, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
 CACAO—Native, 12c. per lb.
 CASSAVA STARCH—\$5.00 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Rio and Jamaica, 13¼c. to 14c. per lb. (retail).
 —Creole, 12c. per lb.
 DHAL—\$3.60 per bag of 168 lb.
 EDDOES—72c. to 96c. per barrel.
 MOLASSES—Vacuum pan yellow, 16c. per gallon (casks included).
 ONIONS—Lisbon, 4½c. per lb.
 PEA NUTS—American, 5½c. per lb. (retail).
 PLANTAINS—24c. to 44c. per bunch.
 POTATOS, ENGLISH—\$1.90 to \$2.00 per barrel.
 RICE—Ballam, \$4.25 per 177 lb.; Creole, \$3.90 per bag.
 SWEET POTATOS—Barbados, \$1.20 per bag; \$1.32 per barrel.
 TANNIAS—\$1.44 to \$2.04 per barrel.
 YAMS—White, \$2.16 per bag.
 SUGAR—Dark crystals, \$3.20 to \$3.25; Yellow, \$3.50 to \$3.70; White, \$4.50 to \$4.75; Molasses, \$2.60 to \$2.80 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—May 18, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.80 to \$12.00; estates, \$12.25 to \$12.75 per fanega (110 lb.); Venezuelan, \$12.25 to \$13.00 per fanega.
 COCOA-NUTS—\$20.00 per M.
 COCOA-NUT OIL—74c. per Imperial gallon (casks included).
 COFFEE—Venezuelan, 9c. to 9½c. per lb.
 COPRA—\$2.70 to \$2.80 per 100 lb.
 ONIONS—West Indian, \$1.85 per 100 lb. (retail).
 POTATOS, ENGLISH—85c. to \$1.05 per 100 lb.
 RICE—Yellow, \$4.30 to \$4.40; white, \$4.50 to \$5.60 per bag.
 SUGAR—White crystals, \$4.50; Yellow crystals, \$3.00 to \$3.50; Molasses sugars, \$2.50 to \$3.50 per 100 lb.



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Agricultural Progress at Tobago.

IN June 1900 the Imperial Department of Agriculture issued a Pamphlet (No. 2) containing notes on 'Planting at Tobago.' The notes chiefly related to the cultivation of cacao, fruit trees, and yams, and were widely distributed in

the island. The recent official visit of the Governor (Sir Henry M. Jackson) to Tobago and the invitation extended by him to the Imperial Commissioner of Agriculture afforded a convenient opportunity for making observations as to the progress reached in establishing Botanic and Experiment Stations and in estimating the general advance made in extending the cultivation of the staple crops of the island.

Tobago has an area of 114 square miles (73,313 acres) or about four-fifths the size of Barbados. The formation of the island is volcanic: its physical aspect is irregular and picturesque with conical hills and ridges and numerous fertile and well-watered valleys. The population in 1901 was 18,751, or 164 to the square mile. The climate is described as 'one of the healthiest in the tropics.'

In the Appendix to the Report of the Royal Commission of 1897 (p. 108) it was stated that 'the present condition of Tobago, in spite of its fertile soil, healthy climate, and an industrious labouring population, is a striking instance of what may happen to other portions of the West Indies unless timely and well-organized efforts are made to improve the sugar industry, and (where suitable conditions exist) to start new industries.'

The productions of Tobago are of a singularly diversified character. In a table of the exports of Tobago for the year 1896 the total value was given as £10,340. Sugar and molasses were exported to the value of £1,983; cacao, £1,125; cattle, £1,465; pigs, £1,327; poultry and eggs, £1,184. All produce was

shipped to Trinidad. There is practically no direct export trade between Tobago and other countries.

In returns furnished by the Warden for the official year 1904-5 the total value of the exports is given as £26,162, or an increase at the rate of 154 per cent. in eight years. Sugar and molasses were exported to the value of £3,302; cacao (in spite of an unfavourable season), £3,984; cattle, £2,820; pigs, £1,488; poultry and eggs, £1,631.

In order to illustrate still further the singularly diversified character of the products of Tobago, a table is published on the opposite page showing in detail the value of the exports for the years 1896 and 1904-5 respectively.

Tobago became a ward of the colony of Trinidad in January 1, 1899. Since that time, owing to the establishment of a regular coastal service and the systematic improvement that has taken place in the means of communication by driving and riding roads, and the erection of bridges, outside capital has been attracted, and an appreciable number of resident proprietors has settled in the island. It is now proposed to establish a system of wireless telegraphy between Tobago and Trinidad.

The site of a Botanic Station, to be carried on under the auspices of the Imperial Department of Agriculture, was selected in November 1898. The situation is a convenient one, being close to the landing wharf at Scarborough and approached either from the public road adjoining the wharf or from a spot on the road to Government House. The station is now fully equipped, is a popular place of resort, with one of the most attractive collections of ornamental plants in the West Indies. In addition, there are maintained large collections of economic plants available for distribution throughout the island. A travelling Agricultural Instructor is employed to afford practical information in regard to the cultivation and the treatment of diseases of cacao and other crops.

On the occasion of the visit of the Governor and the Imperial Commissioner of Agriculture, a public meeting was held at the Court House, Scarborough, on May 24, when the Commissioner delivered an address reviewing the prospects of sugar, cacao, rubber, cotton, the rearing of cattle and small stock, and the requirements of a sisal hemp and fruit industry.

The sugar industry, as shown in the table of exports, has been extended of late years, and there is no reason why it should not eventually prove successful on a still larger scale. The total export value of cane

products in 1904-5 was £5,302, as compared with £1,983 in 1896.

The most promising industry of Tobago is cacao. The area under cultivation has largely increased in recent years; and when the young cacao lately planted comes into bearing, it is not unlikely that the exports will reach a value of £8,000 to £10,000. The cultivation of rubber trees is a new industry in the West Indies, and Tobago is the only island that has hitherto shipped rubber on a commercial sale. There are from 8,000 to 10,000 rubber trees (*Castilloa*) under cultivation on Richmond estate by Captain Short, and, taking all ages, a still larger number on the estates of the Rubber Syndicate at Louis d'Or. In many cases the rubber trees are used as shade for cacao. Cotton (Marie Galante variety) is cultivated on Golden Grove estate by Dr. Latour. It is probable that 30 bales (of 360 lb. each) will be shipped this year. Another new industry is the export of bay leaves and bay oil (£317).

Owing to the facilities offered by frequent communication with Trinidad, Tobago contributes largely to the requirements of Port-of-Spain in horses, sheep, pigs, poultry, eggs, and vegetables.

Altogether, the prospects of Tobago are brighter than they have been at any time during the last thirty years. It is estimated that there are large stretches of fertile and accessible lands still available for the cultivation of cacao, rubber, cocoa-nuts, fruit, cotton, limes, and tobacco. The absence of destructive hurricanes, the fairly equable rainfall (averaging 65 inches per annum), with the improved means of communication by land and sea, as also the nearness of a large and increasing market in Trinidad for all kinds of produce, render Tobago a promising field for intending settlers.

The amount of capital required would depend on the industry in view. For cacao a capital of about £3,000 to £4,000 would probably be necessary. For cotton and fruit a capital of about £1,500 to £2,000 would probably be sufficient.

A Planters' Association has lately been formed in order to advance the Agricultural interests of the island. A 'Hand-book of Tobago' containing a brief historical, geographical and general account of the island compiled by Mr. L. G. Hay (a former treasurer) in 1884, and revised by him in 1898, was published in 1899 at the *Daily Chronicle* Office, Georgetown, Demerara, (Price 2s. 6d., post free 2s. 7½d.).

The Pamphlet (No. 2) on 'Planting in Tobago' referred to above is now out of print but it is proposed to bring out a new edition later on.



SUGAR INDUSTRY.

Hawaii.

The following note on the sugar industry in Hawaii is extracted from the *Consular Report* on the territory for the year 1903-4:—

The sugar-producing islands of the group are, in the order of their output, Hawaii, Oahu (on which Honolulu is situated), Maui, and Kauai, with an acreage of 94,000 acres planted with cane for the crop of 1904, and an acreage under cultivation of some 220,000 acres altogether.

For the year ended December 31, 1904, the total crop for the whole group reached 367,475 short tons (328,102 tons avoird.) compared with 437,991 short tons (391,063 tons avoird.) in the previous year, a fall of nearly 63,000 tons, but a larger total than that of 1902; and, with the exception of the crop of 1903, the highest that has yet been recorded.

Much damage has again been experienced from the ravages of the 'leaf-hopper' (*Perkinsiella saccharicida*) and other pests, whilst in some parts fungus diseases have also been prevalent. It is, in fact, only by the employment of the greatest skill and care, combined with the most progressive methods of irrigation, fertilization and the like, that plantations have been able successfully to fight against these drawbacks and the handicap of dear labour and cheap sugar prices.

The Manufacture of Rum in Martinique.

M. M. Colletas contributes to the *Journal d'Agriculture Tropicale* an interesting article on the manufacture of rum in the French West Indies. Much of the information, it is stated, is taken from a book by M. F. A. Pairault, entitled *Le Rhum et sa Fabrication*. The following extracts are likely to be of interest:—

In the West Indies the name 'country' rum (rhum d'habitant) is given to the product distilled from the fermentation of sugar-cane juice whether raw or boiled. This liquor is little known outside the countries in which it is produced. 'Tafia' or manufactured rum is obtained by the fermentation of the residual molasses and scraps of sugar-cane. This product, more or less adulterated, is known exclusively in Europe under the name of rum.

The town of St. Pierre (Martinique) was the centre of the most important rum industry of the world. The countries, which, at the present time, produce the largest quantities of manufactured rum at 55° are: Demerara, 3,500,000 gallons; Jamaica, 2,310,000 gallons; Guadeloupe, 638,000 gallons; Mauritius, 704,000 gallons. Before the eruption of Mount Pelé, Martinique produced 4,620,475 gallons of rum at 55°. Then came Reunion with 352,000 gallons, and Trinidad with 119,000 gallons.

Rum is distinguished from other alcoholic liquors by a special odour formed by a blending of ethers, ordinary alcohol, higher alcohols, aldehyde, acetal, and other undetermined compounds. This aroma depends on the raw material, the yeast, on the 'vinasse' added to the unfermented sugar, on the grade of rum, and lastly on the distiller's apparatus. M. Pairault has proved that the micro-organisms—bacteria and moulds—which swarm in the fermenting vats, do not contribute to the aroma of the rum.

EXPORTS OF TOBAGO.

The following is a table illustrating the value of the productions of Tobago exported to Trinidad during the years 1896 and 1904-5:—

Produce.	1896.	1904-5.	
	£	£	s.
Sugar	1,827	3,243	14
Molasses... ..	156	58	2
Rum ... ..	...	2,000	17
Cocoa-nuts	210	301	3
Cocoa-nut Oil	621	2,143	1
Cacao	1,125	3,984	0
Vegetables	1,004	5,423	6
Fruit in packages	6	125	10
Poultry	871	1,463	6
Eggs	313	168	7
Cedar	40	...	...
Turtles	16	183	3
Asses	15	18	6
Cattle	1,465	2,820	0
Dogs	8	63	15
Goats	432	364	4
Horses	650	637	10
Pigs	1,327	1,488	9
Sheep	254	92	0
Bay Leaf ... ..	...	8	0
Bay Oil ... ..	...	309	0
Coffee ... ..	...	1	17
Charcoal ... ..	...	...	10
Confectionery ... ..	...	17	16
Copra ... ..	...	409	2
Cotton ... ..	...	73	19
Cotton Seed ... ..	...	18	6
Farine ... ..	...	16	4
Fish ... ..	...	54	4
Firewood ... ..	...	24	6
Ginger ... ..	...	4	0
Hides ... ..	...	5	6
Lime ... ..	...	13	11
Lumber ... ..	...	12	2
India-rubber ... ..	...	13	13
Nutmegs ... ..	...	34	7
Starch ... ..	...	9	13
Tobacco ... ..	...	84	1
Turtle Shells ... ..	...	473	3
Total	£10,340	£26,161	13

Bermuda Onions. The Bermuda-grown onions, which the Dempster Steam Shipping Company has recently been distributing among the restaurant keepers of London, represent a small, serviceable, solid type of the brown Spanish onion, which does not show the slightest tendency to start into growth. The firmness and solidity of the flesh is one of the principal features of the onion, but in reference to its apparently good keeping qualities, it is requisite to know when and under what conditions the onions were grown, and what steps were taken to preserve them. The object sought by the company is to create a demand for the onions, which, so far as it is understood, will be grown in Bermuda, but their distribution will be a monopoly of the company. The onion is said to cook well and be both succulent and tender to the palate. (R. D. in the *Gardeners' Chronicle*.)



WEST INDIAN FRUIT.

SHIPMENTS OF BANANAS FROM BARBADOS.

By the mail steamer which left Barbados on June 3, 1,214 bunches of bananas were shipped by the Imperial Department of Agriculture. There were also shipped 25 bales of cotton, 5 crates of mangos, 1 barrel of yams, and 1 barrel of potatoes.

Since the first mail in January of this year eleven shipments of bananas have been made, consisting of 14,723 bunches. During the same period last year twelve shipments were made, consisting of 2,290 bunches.

COLONIAL FRUIT EXHIBITIONS.

The following circular letter, signed by the Secretary of the Royal Horticultural Society, has been received by the Imperial Commissioner of Agriculture:—

The President and Council have decided to hold at their new hall a show of colonial-grown fruit, on December 5 and 6, 1905, to be followed by others in March, May, and December 1906.

Our object in fixing these dates is, if possible, to suit the season which is most likely to find the produce of Canada, British Colombia, and the West Indies; of India, and the Cape; and of Australia, Tasmania, and New Zealand, in the greatest perfection in London.

The Council would be greatly obliged by any suggestions you may be able to make, and trust to be favoured with your co-operation—on the one hand, in their efforts to make the excellence of colonial produce better known in Great Britain; and on the other hand, in making the fact of these exhibitions well known beforehand throughout the length and breadth of the Colonial Empire, and so in assisting to gather up the finest and most varied examples of fruits, and other vegetable productions, which each individual colony can supply.

The actual dates in 1906 will be settled before the end of the present year.

BANANA CULTIVATION.

The following note is taken from the *Journal of the Jamaica Agricultural Society*:—

If our grade of fruit is not improved, and it is not kept up to the very best, so that large handsome bunches are exported, it is quite probable that we shall find ourselves left a great deal more out of the markets than anyone will

relish. There are often bananas planted in most unfavourable spots on chance, while rich little valleys are available on the same owner's land. Bananas should be planted in the richest spots only, and every effort made to produce the best bunches—or else we may soon have to retire from the trade. In good seasons no crop brings in so much money to the small settler as bananas, in districts where the soils grow them well. Even where land requires to be penned or manured, bananas are still a most profitable crop. It would be all very satisfactory to grow them and urge their cultivation, if it were not for that weakness of the people, that great tendency to drop other things that take more labour, the tendency also when money is coming in quickly to rest upon their oars and let the future alone. By all means cultivate bananas wherever they will produce good bunches, but let them be always looked upon in the light of a catch crop, like corn or provisions, and go on with the staple crops just the same. Bananas should be an addition to other things; it is seldom that circumstances should allow them to be looked upon as the principal product and dependency.

THE CULTIVATION OF CITRONS.

The *Consular Reports* on the Morea and the Cyclades (Greece) for 1904 have the following notes on the cultivation and shipment of citrons:—

The cultivation of citrons is greatly on the increase in this consular district. In localities where it is sheltered from the wind and can be watered frequently, the tree thrives luxuriously and gives very good results to growers.

For export the citron is cut in half and shipped in casks containing specially prepared pickle. Very little has been shipped to the United Kingdom up to the present, although it is reported that the quality of the Greek product is excellent; the United States buy the greatest portion of the Greek crop, the price of which varies, according to seasons, from £17 to £24 per ton f.o.b. Shipments to New York from Patras alone amounted last year to a value of £9,377.

The export trade in citrons in brine at Syra was also satisfactory. The fruit mostly comes from Crete and is carefully selected and packed in casks of brine at Syra. America was again the best purchaser last year, taking 737 tons, valued at £14,519.

Reference to an experimental shipment of citron peel in brine from Dominica will be found on p. 184 of this issue of the *Agricultural News*.

COLONIAL AND INDIAN EXHIBITION.

The following description of the West Indian Court at the Colonial and Indian Exhibition is reproduced from the *West India Committee Circular*:—

The Court, which stands back in a splendid position in the north transept of the Crystal Palace, occupies a space of 7,000 square feet, and is surrounded by a handsome screen of architectural design, having facias of peacock-blue supported on Georgian columns decorated in deep buff, and relieved with mouldings forming rectangular panels. There is an inner screen of lofty sugar-canes, which form a striking feature, and which will, it is hoped, serve to remind the British public that cane sugar comes from our colonies and beet sugar from foreign countries, and induce them to ask for and insist upon getting pure cane sugar, which is *really* pure, sweet, and economical.

Entering through the wide arch nearest the centre transept, the visitor finds himself in the Jamaica section. Two large banners, bearing the coat of arms of the colony, adorn the main entrance, and the passage to the adjacent sections is under an arch surmounted by a large crocodile. Among the preserves there is also a turtle surrounded by the many succulent products with which its name and substance are connected. To the right and left of the entrance are large show cases for Jamaica cigars, cigarettes, and tobacco belonging to the Montpelier Cigar Company and Messrs. B. & J. B. Machado, both of Kingston, Jamaica. To the left again is a very complete collection of samples of Jamaica woods, arranged like books in a book-shelf, each sample having its name on the back. A screen carries a number of pictures of Jamaica life and scenery, among them being several notable works of Mr. J. Kirkpatrick, and here, too, is a table of literature and files of the newspapers of the island. Portraits of the Governors of the island occupy another screen on the right-hand side of the section. Seeds, seed ornaments, lace-bark in many forms, bitter-wood cups, and walking sticks of various woods are shown in great quantities, and are already finding a quick sale. In glass cases adjoining, the more valuable specimens of lace-work and jippi-jappa hats are displayed. Of consumable Jamaica produce, sugar, cacao, coffee, cassava, arrowroot, tapioca, bread-fruit, pimento, and almost every conceivable kind of tropical commodity are to be found, so closely have the Exhibition Committee in Jamaica and Mr. John Barclay, the Commissioner, devoted themselves to the task which was set them. Jamaica tea is a welcome novelty, the development of which it will be very interesting to watch. Messrs. William Alfred Jones & Co., of Liverpool, show Jamaica cigars and bananine, a banana flour. A more comprehensive exhibit than that in the Jamaica court it would not be easy to find.

Passing under the archway, the Grenada section is found on the left. The most striking object in this is the gold mace of the colony, which was sent out to Grenada in a ship called the 'Baillies' in the year 1791, and now makes its reappearance in England for the first time since that date. This island being known as the 'Spice Island of the West,' it is natural that spices should form a prominent feature in its display. Various stuffed animals, including a monkey and several specimens of mongoose, will also prove an attraction, while bottled fruits, preserves, and spices are attractively shown in sample glasses. The exhibits are clearly set out on an open show-stand painted buff colour picked out with blue. This is flanked by two glass cases in which the choicest articles are displayed. Below are some fine samples of leather and the wonderful conch

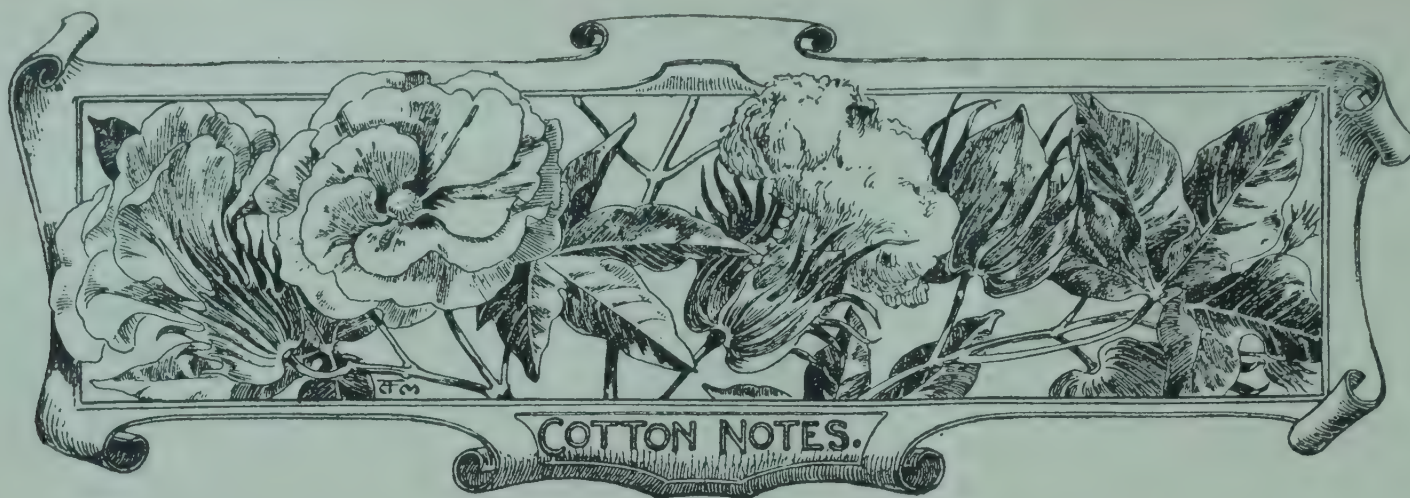
shells so much run after by tourists. Coral, too, of most fantastic shapes, bulks largely in this section. There is also a fine collection of Carib implements, the only relics now remaining of the former inhabitants of the island. Mr. C. Falconer Anton is to be congratulated upon the collection which he has got together; the more so as we believe this to be his first experience of exhibition work.

To the left again is the Barbados section arranged under the supervision of the Hon. Forster M. Alleyne, the Commissioner for the island, in which sugar is very naturally a prominent feature. This, with rums, coloured and uncoloured, is shown in great variety in glass-stoppered bottles, each bearing a distinctive label, with the arms of the colony neatly printed upon it in blue. Liqueurs, arrowroot, tous-les-mois, cassava products, candied shaddocks, grape fruit, preserves, pickles, and hot sauces are shown on a central stand, consisting of two columns with tiers of shelves, the columns being connected by an arch bearing the name of the colony in blue letters on a white ground. Manjak, pottery, a statuette of coral rock, models of a flying-fish boat and estate carts are set out on shelves about the sugar-cane screen which surrounds the section, and below are baskets of yams, eddoes, and Sea Island cotton. A wonderful collection of Barbadian seeds, made by a girl of thirteen years of age, has been found a space near the Royal Mail Steam Packet Company's exhibit referred to below. Mr. H. Martin Sells has kindly lent for exhibition in this court a large glass case containing coral and flying and other fish of great interest.

To the immediate right of the crocodile arch are two shelves of samples of manures, shown by the Anglo Continental Guano Works. Near by is a comprehensive display of limes and lime products by Messrs. L. Rose & Co. A pyramid of bottles of lime juice supports a golden dome, crowned by a basket of roses, which serves to remind visitors of the name of this enterprising firm. Facing this is an octagonal stall for the sale of West Indian produce. Messrs. James Philip & Co., the Pure Cane Sugar Company, have a large show-case beyond this stall, containing every kind of West Indian produce imaginable; and across the gangway Messrs. F. Everington & Co., of Melville Hall estate, Dominica, exhibit limes, cassava, and other local produce.

Further to the right is the section occupied by the Royal Mail Steam Packet Company, who show, besides many bottled fruits and preserves, a fine model of the West Indian mail steamer 'Tagus.'

Passing again down the middle gangway, the visitor then reaches the Trinidad section arranged personally by Mr. J. H. Hart, the Commissioner, who, it is easy to see, has had previous experience of exhibitions, in which the products exhibited are extremely numerous. The section is surrounded by red baize, which, though lessening the light appearance of the sugar-cane screen, certainly shows off the exhibits to very great advantage. On the left on entering is a wide range of sugar samples in glass bottles, and near by are asphalt and allied products, shown by the New Trinidad Lake Asphalt Company. Manjak, petroleum, and kerosene are appropriately situated near this exhibit, and mention must be made of a dress model showing what Trinidad can do in the way of dyeing. Tobacco, cigars, and cigarettes are shown under glass, and nutmegs, coffee, rice, and starches are on a long table close by. Lace-bark d'oyleys and lace of great value also find a place in a glass case, as also does a collection of coolie jewellery made in Trinidad. To the right of the entrance of this section is as fine a display of Trinidad cacao as has ever been shown, we may venture to say. The samples are in tall glass-stoppered bottles. . . .



ANGUILLA.

The *St. Kitt's Daily Express* of May 29 has an article on cotton cultivation at Anguilla, from which we extract the following:—

We understand that Mr. D. J. van Romondt, of St. Martin, who started a small ginnery in the island of Anguilla in March last, has exported about 12,000 lb. of Sea Island cotton, and that he is now making strenuous efforts to get the cultivation of that product materially increased. He has cultivated in the last two years a large area of his own plantation at St. Martin in this cotton, and from his small ginnery there has turned out this season 130 bales. We feel persuaded that this industry is the sheet-anchor of that poor island. We are informed that Mr. van Romondt has reaped as much as 1,000 lb. seed-cotton per acre from some of his fields.

BARBADOS.

The *Manchester Guardian* has the following reference to the cotton industry in Barbados:—

The *Agricultural News* (Barbados), the official organ of the Imperial Department of Agriculture of the West Indies, publishes an account of the proceedings at a very successful conference of cotton growers held at Barbados on April 14, at which an address was given by Sir Daniel Morris. In the discussion which followed some interesting facts were put before the meeting by various cotton growers. There appeared to be a general feeling that the prospects of the industry were good, and that, where efforts had been made to keep the cotton worm in check and the soil had been well cultivated, the results had been satisfactory. In many cases the yield of seed-cotton had not come up to expectation, but this was, for the most part, attributed to the drought. Efforts are being made to obtain a careful estimate of the average cost of growing cotton and placing it on the English market. It was suggested by Sir Daniel Morris that a special meeting of the Agricultural Society should be held later to discuss the question whether cotton could be grown as a 'catch crop' with cane in Barbados. This, says the *Agricultural News*, is an important point which deserves careful consideration on the part of the planters.

THE MANURING OF COTTON.

The following article has been written for the *Agricultural News* by the Hon. Francis Watts, C.M.G., D.Sc., Government Analyst and Agricultural Chemist for the Leeward Islands:—

The yield of cotton is profoundly influenced by season and by the condition of the soil: under the head of season may perhaps be included not only rainfall but also exposure

to wind; the cotton plant is very sensitive to wind and grows much more vigorously when sheltered.

The condition of the soil has a most important bearing; for its best development Sea Island cotton requires rather light soil and requires the soil to be in a good state of tilth. Good tilth can be obtained by the application of organic manures such as farm-yard manure, compost, green-dressings; therefore in preparing for planting cotton care should be taken to see that the soil is in good condition, and, if necessary, one of the organic manures mentioned should be used. In experiments conducted in the Leeward Islands during last season, it was found that, in cases where the soil was in good condition, the yield of cotton was not increased by the application of artificial manures, though doubtless, there are cases where the use of artificial manures will prove of use. However, in the earlier stages of the industry it will be safer if cultivators of cotton take care to keep their land in good general condition by the use of organic manures, than if they trust to the use of artificial manures to make good the defects of bad farming. Possibly, however, it may be found, after cotton has been grown for some time on the same land, that artificial manures can be usefully and profitably employed to make good defects in the soil which may not appear in the early stages of the industry.

There is little room for doubt that cotton will require careful attention in the matter of manuring. What is here sought is to indicate what may be considered the *natural* manures, the use of which the cultivator must not neglect while seeking a short cut to success by means of artificial ones. There are certain underlying, fundamental principles which will serve to guide the cotton planter, and on which he will be able to build up his practice, at the same time extending his knowledge of the applicability of all the various kinds of manures within his reach.

A sugar crop makes comparatively little demands upon the soil because of the return to the soil of a large quantity of waste products such as the trash and tops of the canes, which either go back directly to the soil or find their way back as pen manure. The mud or scum of the clarifiers and filter-presses carries back a large proportion of the nitrogen and phosphate, while the ashes from the megass restore to the soil a considerable part of the mineral matter contained in the cane. The sugar itself carries away comparatively little of the fertilizing constituents in the soil, thus, with the help of comparatively little artificial manure, the sugar-cane has been cultivated in some instances for some two hundred years almost continuously on the same land.

A cotton crop makes some demands upon the soil if we take both lint and seed into consideration; but the nitrogen, phosphate and potash, the substances usually considered in connexion with manurial questions, are nearly all contained in the seed, there being but very small quantities in the

lint. This being so it appears evident that a cotton crop will make but small demands upon the soil if the cotton seed is returned as manure, or if equivalent quantities of manure of other kinds are given. When, as is often advised, the bush of the cotton plant is burned to destroy pests, there will be some loss of nitrogen, but the mineral constituents will be returned to the soil.

In the article in the *West Indian Bulletin* (Vol. V, p. 223), it is estimated that a crop of 200 lb. of lint per acre will be accompanied by 443 lb. of seed. This figure is somewhat below that indicated by our experience in the Leeward Islands, where I would estimate rather over 500 lb. Taking the 443 lb. mentioned, it is found that this contains $15\frac{1}{2}$ lb. of nitrogen, $7\frac{1}{2}$ lb. of phosphoric acid and 7 lb. of potash. The greatest demand on the soil will therefore be in respect of nitrogen, particularly as some nitrogen will be lost by burning the bush, and also as there is always a natural tendency on the part of the soil to lose some of its nitrogen. A dressing of about 500 lb. of cotton seed per acre will thus restore the plant food removed by a moderate crop of cotton, and if this is supplementary to the use of a moderate amount of organic manure, it will probably be all that is required.

It may, however, happen that cotton seed is not available or only in limited amounts, or that the amount of organic manure is limited; under these circumstances the use of artificial or chemical manures may be desirable. For this purpose I would suggest a general manure like that mentioned on p. 57 of the pamphlet *A. B. C. of Cotton Planting*, but with rather less phosphate: the phosphate might, I think, be safely reduced to 40 lb., and the proper manure would be prepared by mixing 300 lb. of good superphosphate, 40 lb. of good sulphate of potash, and 100 lb. of good sulphate of ammonia; this mixture should be applied at the rate of 440 lb. per acre* or in proportionately small quantities when used in conjunction with cotton seed meal or the organic manures mentioned above. Thus, for example, 250 lb. of cotton seed and 200 lb. of the above mixture would probably be a good manuring for a field in fairly good condition.

Manures for cotton should be given early. They may with advantage be placed in the furrow or 'hole' where the cotton seed is to be sown. Cotton seed so used should be applied about a month before the seed is sown so as to allow the cotton seed used as manure to decay and become incorporated with the soil before the young plant springs up. Chemical manures should be applied about a week before seed sowing.

The oil which the cotton seed contains has no manurial value: on the contrary, it rather retards the decay of the seed, thus delaying the manurial action of the manure; it is not, however, seriously detrimental. Cotton seed from which the oil has been pressed is therefore somewhat more useful as manure, as it is concentrated by the removal of the oil and is rendered rather more rapid in its action.

In some cases, where animals are kept, it may be found more profitable to feed the cotton seed to animals and to use the resultant manure for the cotton fields. This is sound farming, provided that the needs of the cotton fields are honestly considered, that the manure from the animals is properly conserved, and some allowance made for loss and waste. It is in this connexion that the artificial manure mixture mentioned above may be made to play a useful part. The manure from the animals should be worked into

the soil during its early preparation, and then a week or two before seed sowing a dressing of from 2 cwt. to 4 cwt. of the mixture should be given according to circumstances.

ANTHRAX.

Anthrax has long been known as a very fatal disease. From its nature, however, very little can be done to cure an animal affected with it. The course of the disease is, in fact, so short that frequently its presence is not suspected till the first victims are found dead, and its spread is sometimes so rapid that serious loss occurs before any measures can be taken for its suppression. Preventive inoculation is being practised in many places, and it has been found that the annual loss in anthrax regions has been greatly reduced by this means.

Inoculation for the prevention of any disease consists in producing a mild form of the disease by means of a pure culture of the organism causing the disease. In this way an inoculation fluid is produced containing a large number of anthrax bacilli, which have been so modified by heat until much of their original virulence is lost, and the disease produced by inoculation with this fluid is much milder than when contracted from natural sources of infection.

In the case of anthrax inoculation, two fluids are used, one—the weaker—for the first inoculation; the other, used for the second inoculation about twelve days after the first, being considerably stronger. The fluids are injected by means of a hypodermic syringe under the loose skin about the neck. These inoculation fluids are used for cattle and sheep, and though there has been much controversy as to their value, the experience in British Guiana and Trinidad, as well as in other countries, indicates that a large degree of immunity can be obtained by their use.

The anthrax vaccines used in Trinidad and British Guiana are prepared by the Liverpool School of Tropical Medicine, and it is believed that animals which have been properly inoculated are not likely to be attacked in case of subsequent outbreaks of the disease.

In addition to inoculation to prevent anthrax, other preventive measures may be adopted.

If pools of stagnant water exist in localities where anthrax is known to occur, they should be drained, or they may be fenced off so that the animals may not have access to them. Portions of a pasture known to be infested should be fenced off, or the pasture abandoned for a few years. The carcasses of animals that have died from anthrax should be properly disposed of, since every portion of such animal contains the anthrax organism, which, when exposed to the air, forms spores. These spores are very resistant to heat or cold, drying out or soaking, and are capable of growing in suitable conditions, even though they may have experienced years of unfavourable conditions. Anthrax carcasses should be burned or buried. If buried they should be covered with quick-lime. On no account should any such carcass be opened. Stables where anthrax animals have been kept should be thoroughly disinfected by means of strong solutions of chloride of lime, as should also the spots in pastures where such animals have died.

The U. S. Department of Agriculture recommends that inoculation should not be practised in localities where anthrax has never occurred, as the disease germs are present in the vaccine fluid, and there is a possibility that the disease might be introduced into a new locality, if the fluid happened to be carelessly used. It is also recommended that none but trained veterinarians should perform the work of inoculation.

* With superphosphate costing \$22, sulphate of potash \$65, and sulphate of ammonia \$75 per ton, the above 440 lb. of mixture will cost \$7.46.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

Agricultural progress at Tobago is the subject of the editorial in this issue. The exports of Tobago are of a diversified character, and their value has increased 153 per cent. in eight years. Cacao is now the most promising industry, the area under cultivation having largely increased. In connexion with this subject interest attaches to the table of exports on p. 179.

A detailed description is published on p. 181 of the West Indian Court at the Colonial and Indian Exhibition opened in London last month.

The notes on cotton (see pp. 182-3) include an interesting communication from Dr. Watts on the manuring of cotton.

On p. 186 will be found two illustrated articles relating to the treatment of insect pests. One deals with a useful machine known as the Auto-spray, and the other with a fumigating tent recently made for the Botanic Station at Dominica.

On p. 187 an interesting account of the West Indian Whitebait or 'tri-tri' is reproduced.

Ripe-rot of bananas is the subject of a note on p. 189; this is followed by a brief review of the pod diseases of cacao.

An interesting note of scientific interest, relating to the deterioration of plants propagated vegetatively, is published on p. 190. On p. 191 will be found Mr. J. Russell Murray's monthly report on West Indian produce in Canada.

Barbados Local Exhibition.

It has been arranged that the Local Agricultural Exhibition, for peasant proprietors and others at Barbados, will be held by kind permission of Mr. Alistair Cameron, the Attorney, at Bushy Park estate, St. Philip, on Tuesday, December 6 next.

The preliminary announcement by means of posters will be issued in the course of a few days. In the meantime, vegetable and other seeds will be obtained for distribution to cultivators and to teachers in charge of school gardens, etc.

Citron Peel from Dominica.

As an experiment, a barrel of citron peel in brine was recently shipped from the Botanic Station, Dominica, to Messrs. Pink & Sons, Portsmouth. The net weight of the peel was 1 cwt.

The report received from the consignees intimated that the value of such peel was 19s., and that it was suitable for confectioners' use. It was pointed out, however, that the pulp should not have been extracted, as this renders the peel liable to become damaged, also that more salt should be used. The citron, it is stated, should be merely cut in halves, from end to end, and placed in the strongest brine (saturated solution).

Had the present shipment, which was fermenting slightly on arrival on account of insufficiency of salt, arrived in better condition, it would have been worth 1s. to 1s. 6d. more. The barrel was sold for 19s.; the sale expenses amounted to 3s., packing, freight, and shipping expenses to 9s.

Messrs. Pink & Sons suggest that if a net return of 15s. to 16s. would be considered satisfactory, further shipments might be made, but preferably in small quantities at a time at first.

The Production of Maple Sugar.

According to an interesting article in the *Sugar Planters' Journal*, the largest producers of maple sugar products are the States of Ohio, Vermont, and New York. Of all the species of maple, the sugar maple and the black maple yield the most and the best sap.

The old method of collecting the sap by making a diagonal cut in the tree has long been abandoned in favour of boring a hole, 1 inch deep and $\frac{3}{8}$ inch across, into the sunny side of trees over 12 inches in diameter. Usually only one hole is made in each tree. Improvements have also been made in the methods of handling the sap.

Although the output from maple trees has decreased during the last twenty years, the demand for both the sugar and the syrup has constantly increased. This means that the trade has been supplied by adulterated products and fabrications. In fact, it is estimated that seven-eighths of what is sold as maple is a spurious article. Consequently the price of the pure article is kept down, and a forest of maples is not as profitable to its owner as it might otherwise be.

Cacao and Dye-woods in France.

According to the *Consular Report* on the district of Havre for 1904, the imports of cacao again showed a falling off. The principal sources of supply were Trinidad, the Spanish Main, Bahia, Para, Hayti and San Domingo, Guayaquil, and Martinique and Guadeloupe. The prices were lower than ever. The Trinidad product obtained higher prices than all others.

The Consul impresses on those who grow and pack cacao and other products in British Colonies the necessity of seeing that they are exported in perfect condition and are up to the standard they profess.

Large quantities of dye-woods are also imported into Havre, chiefly logwood and yellow woods from Jamaica and Hayti.

Cloves in Pemba.

The exports of cloves from Pemba reached a higher figure during 1904 than in any previous year, viz., 14,447,586 lb., of the value of £206,394. The actual output would probably have been even greater, it is reported in the *Consular Report* for 1904, had it not been for unfavourable climatic conditions. In spite of very gloomy predictions as to the insufficiency of the labour supply, the extraordinarily abundant crop was successfully harvested, and this augurs well for the future prospects of the island; the world wants cloves, and Pemba is the principal source of the world's supply. Of the total exports from Pemba during 1904, representing a value of £229,174, cloves stand for 91 per cent.

Colonial and Indian Exhibition.

Elsewhere in this issue a detailed description is given of the West Indian Court at the Colonial and Indian Exhibition that was opened at the Crystal Palace on May 12.

It will be seen from that description that four of the West India Islands, viz., Jamaica, Grenada, Barbados, and Trinidad, have large and representative collections of exhibits illustrating their resources and products. Besides these, several firms doing business with the West Indies have show-cases and stalls containing various West Indian products.

The Barbados Exhibition Committee has received from the Hon. Forster M. Alleyne, the Commissioner for the island, an interesting report upon the section of which he has charge. He mentions that the exhibits had been so carefully packed that very little damage was done to them in transit. A prominent place had been given to Barbados bananas, six magnificent bunches of which had been received from Messrs. W. Pink & Son, who had promised to renew them weekly.

It is evident from these reports and the press notices that the West Indies are well represented at this important exhibition, and that a considerable amount of attention has been attracted to West Indian produce, and this should certainly assist in promoting trade relations between these colonies and Great Britain.

Vanilla in Tahiti.

In an interesting article by Mr. J. R. Jackson, published in the *Agricultural News* (Vol. IV, p. 38), on the vanilla industry, mention was made of the attempts that had been made by the American Consul at Tahiti to bring into operation a scheme for compulsory inspection of vanilla beans under the control of the Government. It was stated that the industry was likely to be ruined on account of the inferiority of some of the vanilla that was being shipped.

More recent information, contained in a *Consular Report*, announces that exporters who desire to do so can now submit their produce for inspection under government auspices. Beans of the proper quality will be sealed and packed in the presence of an inspector. A nominal charge is made by the Government to cover the necessary expenses. In spite of opposition, chiefly from the Chinese, the authorities appear to be determined to institute a policy of government supervision with a view to ameliorating the present unsatisfactory conditions.

Cultivation of Oranges in Dominica.

A pamphlet (No. 37) is issued to-day by the Imperial Department of Agriculture which is entitled *Cultivation of Oranges in Dominica*. It contains notes by his Honour H. Hesketh Bell, C.M.G., Administrator of Dominica, who has devoted much time and attention with the view of arousing interest in the establishment of new industries in the island.

Experiments on a small scale would appear to indicate that the cultivation of oranges is an industry particularly suited to local conditions, and this pamphlet is issued with a view to assisting those who have already embarked in the industry and also with a view to directing attention to its possibilities in the future. The pamphlet contains detailed directions as to the operations that are necessary in establishing an orange grove, particularly with the operation of budding, for great stress is laid upon the superiority of budded over seedling fruit. Reference is also made to the necessity for systematic and regular spraying with the view of keeping insect pests, especially scale insects, in check.

In the preface to these notes the Imperial Commissioner of Agriculture urges very strongly the desirability of paying close attention to the picking and shipping of the fruit, and suggests that steps might be taken by the Government or the Agricultural Society to initiate a system of inspection with the view of preventing any but the most carefully selected and best packed fruit from being shipped.

Taking 400 fruits as a fair estimate for a seven-year-old tree, it is calculated that an acre of 100 trees should yield 40,000 oranges equal to about 220 cases. Experience has shown that a net profit of 4s. to 5s. may reasonably be expected on shipments from Dominica. At that rate the produce of an acre should represent about £45. As the annual cost of bringing an acre of oranges into bearing should not exceed £4, very handsome profits may be expected from the cultivation of oranges in Dominica.



INSECT NOTES.

The Auto-spray.

In the *Agricultural News*, Vol. III, p. 250, there appeared a brief note on the auto-spray. The accompanying illustration (fig. 13) should serve to give a clearer idea of this useful machine.

The auto-spray is an automatic, compressed-air spraying machine, the essential features of which are the cylindrical brass tank, an air pump, a discharge hose and nozzle, and a sling for carrying the whole.

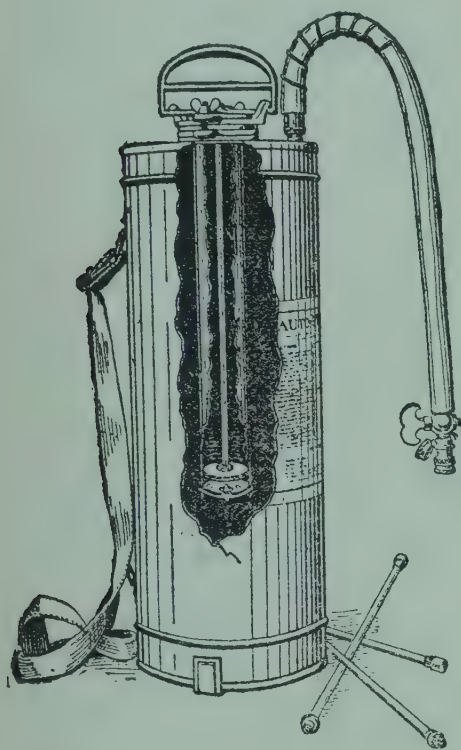


FIG. 13. THE AUTO-SPRAY.

In this machine the pumping is all for the purpose of compressing the air in the tank containing the spray material, and the expansion of the compressed air forces the spray through the hose and nozzle. In using the auto-spray not more than 4 gallons of the wash should be put in, and care must be taken not to subject the tank to too great an air pressure.

The nozzle sold with this machine is a special feature, as it combines the Vermorel principle with an automatic cut-off with which also the needle for clearing

the nozzle is combined. The cost of the auto-spray complete with hose and nozzle, in Barbados, is \$10.00.

Fumigating Tent for Dominica.

As stated in the *Agricultural News* (Vol. III, p. 138), fumigating chambers were erected last year at the Dominica Botanic Station for use in fumigating imported plants. These have recently been supplemented by a fumigating tent to be used in fumigating plants in the nursery beds. The Curator of the Botanic Station states that the tent has arrived and appears quite suitable. He finds that it can be fixed and taken down without any difficulty.

This should prove to be very useful as it will now be possible to fumigate citrus and other plants when they are attacked by insect pests instead of spraying them, and as fumigation is more thorough than spraying, the scale insects and other pests that attack young plants ought to be more easily kept in check. Also plants to be shipped or planted in orchards may be fumigated before being lifted from the beds, and the time and labour of taking them to the fumigating house will thus be saved, and the plants will not be the means of distributing insect pests.

The tent is 10 feet long by 5 feet wide and 3½ feet high. The frame is of gas-pipe so made that it may be

taken apart. For ordinary purposes it will not be necessary to take the top to pieces. The mode of fixing the legs is clearly indicated in the accompanying illustration (fig. 14). The cover is made of 8 oz. duck and treated with two coats of boiled linseed oil. The ends and sides are provided with flaps at the bottom which are to be weighted down with stones or soil to prevent the escape of the gas. Hydrocyanic gas will be used for fumigating. This will be generated from potassium cyanide in a mixture of sulphuric acid and water. Experiments will be needed, however, to decide the exact amount of materials and the best length of time, as the conditions in the nursery rows will be somewhat different from conditions in the fumigating house, and the same strength of gas may have a tendency to injure the foliage.

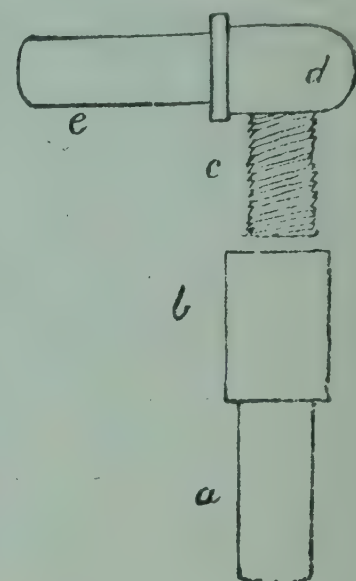


FIG. 14. ATTACHMENT OF LEGS TO FRAME.

AGRICULTURAL BANKS.

In an article on 'Agricultural Credit Banks' in the *Journal of the Board of Agriculture* (London, May 1905) the following references are made to the 'Raiffeisen' system:—

The *Labour Gazette* for April last contains a note on this subject, in which it is stated that, with few exceptions, the societies at present in existence (in Ireland chiefly) are organized upon what is known as the 'Raiffeisen' principle, the main features of which are that no shares are issued, the capital being raised by entrance fees, subscriptions, and deposits and loans bearing a fixed rate of interest; that the liability of the members is unlimited, every member being jointly and severally responsible for any losses that may be incurred by the society; that the loans advanced by the societies are for reproductive purposes only, the borrower being required to satisfy the managing committee that the object for which the loan is required is one that affords a reasonable security for his being able to repay the loan at the date fixed; and that the operations of a society are confined to a small area in order that the personal character and needs of applicants for loans may be known to the members and committee.

The principles on which the agrarian banks known as the 'Raiffeisen' Credit Associations, which date from about the middle of the last century, are based have been mentioned above, and it is claimed that they have effectually delivered the German agriculturists out of the hands of the usurers. Their number has increased very greatly, especially during the past ten years, and similar institutions exist in Austria, Switzerland, Belgium, France, and Italy. In Belgium the number of these societies has increased from thirty-three in 1895 to 313 in 1902 with over 15,000 members.

Co-operative banks have also taken a prominent place in Italy. The Rural Loan Societies, which were considerable in number in 1892, have since increased rapidly, and at the end of 1903 amounted to 1,240. Raiffeisen Banks also exist to the number of 730, but no marked progress in their number appears to have taken place recently.

HABITS OF WEST INDIAN WHITEBAIT.

Mr. Austin H. Clark has contributed to the *American Naturalist* (May 1905) the following account of the West Indian whitebait.

The 'tri-tri' occurs also in Dominica. A few notes on the habits of this fish in that island would be interesting:—

The 'tri-tri' or West Indian whitebait (*Sicydium plumieri*), although of small size, is one of the important food fishes of these islands. It is an inhabitant of the mountain streams, and occurs in the quiet pools and eddies formed by the back-water from rapids, from the lowlands well up into the highlands. Its range is about the same in St. Vincent as that of the 'trout' (*Agonostomus monticola*), and, like that fish, it is absent from certain of the rivers.

The tri-tri reminds one strongly of the common darter (*Boleosoma nigrum olmsteadi*) in habits. They are usually observed lying motionless on the sandy bottom of pools, head up stream. They will lie in one position for a long while, then, with a sudden jerk, move to another place. If disturbed they dart quickly under the overhanging banks, or under rocks or logs in the stream. When seen on a sandy bottom, the colour of these fishes is a very light brownish gray, with seven or eight transverse bands of darker. If over dead leaves, or on darker masses of rock, they are a violet brown, the transverse bands being nearly black. They harmonize so well with their surroundings that they are distinguishable by a careful examination only. The adults measure from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in length. In the waters where this fish occurs there is a small slender crayfish, of the same size and colour, which is very easily mistaken for it. This crustacean has the same habit of lying for a long while in one position, then suddenly moving to another, and, if disturbed, takes refuge under the banks or under stones in the same way. They may usually be distinguished by the fact that they move tail first, and then occasionally crawl slowly on the bottom; they also are much commoner near the sources of the rivers, above the range of the tri-tri.

In the dry season, the adult tri-tri migrate down stream to the sea, where they lay their eggs, probably near the mouths of the rivers from which they descended, * and then apparently die, as no adult fish are ever seen to return.

The young fry, when about $\frac{3}{4}$ inch to $1\frac{1}{4}$ inches in length, ascend the rivers by thousands during the wet season (August, September, and October), moving up stream in a continuous line near or under the banks, as do the young of eels (*Anguilla*). When in a stretch of comparatively quiet water they move steadily onward; but in rapid water they progress by jerks, resting on the bottom for a few seconds, then making a fresh dash onwards and taking a fresh grip on a pebble or rock with the ventral sucker, and after remaining quiet for a few seconds, dashing on again. They even ascend vertical or overhanging surfaces, over which a small amount of water is running in this way, resting for a while, then moving upward an inch or so, resting again, and moving on. Sometimes during one of these ascents they are swept off and into the eddy below; but in a few minutes they are ready to try it again. I have seen as many as a dozen moving up the face of a rounded rock a foot in diameter, over which the flow of water was not enough to cover their

bodies. After a heavy rain the waters of the St. Vincent rivers rise rapidly, and then fall again, leaving many little outlying pools along the banks, which, under the influence of the scorching tropical sun soon dry up, leaving dusty hollows. Many of the fishes become cut off from the main stream at such times, and, as the pools dry up may be seen jumping about in the hollows, entirely covered with a thick coating of dust. If these stranded individuals be placed again in the main stream, they soon begin to ascend with the others as if nothing had happened. The tenacity of life of the young tri-tri is remarkable. They will live for several hours in these dry situations, exposed to the full rays of the sun.

The journey of the fry up the rivers occurs at the time when the migratory shore birds from the north are making their brief stay in these islands, and certain species appear to feed largely on these fishes. On the Richmond river in St. Vincent, where, on account of the lack of vegetation, consequent on the late eruptions of the Soufrière, birds may be readily observed, I found the following species feeding on the young tri-tri: Near the mouth were blue herons (*Florida cærulea cærulescens*), golden plover (*Charadrius dominicus*), turnstones (*Arenaria interpres*), willet (*Symphemia semipalmata*), greater yellow-legs (*Totanus melanoleucus*), lesser yellow-legs (*T. flavipes*), solitary sandpipers (*Helodromas solitarius*), spotted sandpipers (*Actitis macularia*), green herons (*Butorides virescens maculata*), and kingfishers (*Ceryle alcyon*). The solitary sandpipers followed the fish up into the lowlands at the base of the hills, the green herons and kingfishers to the edge of, and even just within, the forests, while the spotted sandpipers are found well up into the mountains. About the mouth of the river I also observed white herons (*Garzetta candidissima*), great blue herons (*Ardea herodias*), and fish hawks (*Pandion haliaëtus carolinensis*), probably attracted by the larger fish which were following the young tri-tri in from the sea, and which were abundant about the river's mouth.

On reaching the pools at the higher altitudes the fish select some suitable spot and there remain until maturity, when they return to the sea to deposit their eggs. I was unable to ascertain just how long this period was.

During their ascent of the streams, numbers of the young are caught by the natives and eaten, either boiled (whole) or fried into cakes. Although when cooked they bear a strong resemblance to maggots, they are very good, tasting something like whitebait.

These fish, or a closely allied species, are abundant in certain streams in Grenada, but are not found on the Grenadines. Their local name is a corruption of that given them by the original Caribs.

MUNGOOSE IN ST. LUCIA.

The Registrar of Civil Status in St. Lucia states, in his report for 1904, that no deaths had occurred from snake-bite during the year, although the Fer-de-lance had not been exterminated, but merely checked. He proceeds to quote as follows from the report of the Magistrate of Districts II and III for 1903:—

The mongoose that has done such excellent work in ridding the districts of serpents is being hunted down by every one. The destruction of poultry and vegetables is the cause of it. They are now in such numbers that it would take a long time to exterminate them. I do not think the time has yet come to get rid of them; they are troublesome in the poultry-yard, but their use as a snake destroyer should not be quickly overlooked.

* The fact that certain rivers in these islands, apparently suitable in every way for these fish, are not inhabited by them seems to point toward the fact that the fish from the neighbouring streams spawn in the vicinity of their mouths; otherwise we should expect to find a few of the young straying into these uninhabited streams every year.



GLEANINGS.

The Curator of the Botanic Station at Tobago announces that seeds of *Castilloa elastica* are now available and will be forwarded to those making application for them.

The average yield of rice (paddy) in British Guiana, on lands properly irrigated and properly drained, is about 28 bags (of 120 lb. each) to the acre. Such a yield is found exceedingly remunerative to the grower.

In reference to the proposal to cultivate broom corn for the Canadian market, it is of interest to note that, according to the *Statistical Yearbook* of Canada, the value of the imports of this product from the United States amounted in 1902 to \$202,487.

The output of canned pine-apples from Hawaii in 1903 was about 8,000 cases (1 case contains twenty-four cans, averaging 2 lb. each); that of 1904 was some 20,000 cases, while the output for 1905 is estimated to reach 65,000 cases. (*Consular Report* for 1903-4.)

Three Agricultural Banks have been started in the parish of Manchester, Jamaica. These are not Raiffeisen banks but are on the lines of Schulze's Credit Associations (see pp. 32-3 of Pamphlet No. 35) except that the liability is limited to the amount of one share.

It was estimated that the local consumption of cocoa-nut oil in Trinidad in 1902 was 700,000 gallons. In the same year 16,000 gallons were exported, in addition to the exports of copra (414 tons). This, with the exports of nuts, represents a crop of about 50 millions of nuts.

The rainfall at the Experiment Station, Tortola, for the year ended March 31 last, amounted to 47.74 inches. This was 8.06 inches below the average of the last four years (55.80 inches) and unevenly distributed; the station suffered from drought, particularly in June and July 1904.

A steam factory for the extraction of albumen from eggs has been established at Chinkiang, China, and this product, to the value of £6,376, was exported to London during 1904. Preserved egg yolk, valued at £4,176, also figures in the exports, and nearly 4,500,000 eggs, fresh and preserved. (*Consular Report*.)

The value of sugar, molasses, etc., sent to Canada, in the year ended June 30, 1904, from British Guiana was about £430,000; in 1900 it was as low as £8,000. The imports into Canada have advanced from \$878,617 in 1900 to \$4,815,758 in 1904. Of the last figure, \$4,352,117 is for sugar, molasses, etc. (*Our Western Empire*.)

The *Montserrat Herald* of May 27 contains a letter from a Surinam correspondent describing cacao cultivation in the latter colony. A number of the estates now dry their produce by artificial heat; a few have also machinery for sorting the beans according to size.

An experiment with a steam saw-mill, to demonstrate the commercial value of the timber in the forests of the interior, is in course of progress at Dominica. Now that the building of the Imperial road has removed many of the difficulties of transport, it is hoped to be able to transport lumber to the coast to compete with imported material.

A meeting of East Indians, under the presidency of Mr. Nadirally Khan, was recently held at Essequibo, British Guiana, at which an interesting discussion took place on the subject of rice cultivation, particularly with regard to the varieties best suited to the colony. It was decided to ask the Board of Agriculture to import different varieties of paddy from India.

According to the recently issued *Consular Report* on Truxillo for the year 1904, the chief exports of this district of the republic of Honduras are rubber, sarsaparilla, dried hides, deer-skins, and mahogany. The exports of rubber amounted to 20,661 lb. About 1,000 head of cattle were exported to Belize, British Honduras, and 9,000 to the island of Cuba.

The Trinidad cacao crop is short this year, the exports being 16,816,485 lb., as against 25,469,570 in 1904. The exports of cocoa-nuts are gradually increasing, the figures being, 1903, 26,227; 1904, 3,796,725; 1905, 4,616,940. Up to May 31, the amount of manjak shipped was 420 tons, as compared with 167 tons for the corresponding period of last year.

Considerable damage has been done to wind-breaks, on some of the Land Settlement estates at St. Vincent, by the careless use of fire. In consequence, a notice has been issued forbidding allottees to use fire on their lands without first obtaining written permission from the Agricultural Instructor or other duly authorized officer of the Agricultural Department.

Messrs. Latham, Alexander & Co., of New York, have issued an estimate of the cotton acreage of the United States for 1905, which they consider as approximately correct as could be secured by direct communication with parties competent to judge. The total estimated decrease of cotton acreage is $11\frac{1}{3}$ per cent., or 3,558,870 acres less than last year. The decrease for South Carolina is 9 per cent., or 231,570 acres.

An important meeting of Trinidad sugar estates' proprietors was held at the West India Committee Rooms on Thursday, May 18, to consider various questions regarding cane farming in Trinidad. Sir Nevile Lubbock presided, and there were present: Mr. Norman Lamont, M.P., Mr. Lionel G. Arbuthnot, Mr. George Christall, and Mr. W. A. Tennant. A provisional agreement was arrived at regarding payment for canes, which it is hoped will prove acceptable to proprietors and cane farmers alike, and copies of this have been sent out to the colony. (*West India Committee Circular*.)

FUNGOID DISEASES.

Ripe-rot or Anthracnose of Banana.

This disease is widely spread; it was first recorded from Australia and has since been noted in the United States. A very similar, if not the same, disease has recently been noted on bananas in the West Indies. The disease is caused by a fungus, *Gloeosporium musarum*.

The following description of the disease, by Dr. N. A. Cobb, is taken from the *Agricultural Gazette of New South Wales* (Vol. XIV, p. 638):—

As soon as the fruits reached a length of about 3 inches, and sometimes earlier, they began to change colour and to shrivel, passing through greenish-yellow, yellow, brown, or French grey, to almost black. At the brown stage the colour became pruinose, and the final blackening was accompanied by a pink eruption of *Gloeosporium* spores.

The spores occurred on all parts of the fruit, but in some specimens they were most abundant on the basal half, being particularly abundant at the very base of the stem.

The disease extended to the entire bunch, which in consequence was rendered worthless.

No other disease-producing organism was to be seen on the specimens sent, which included most of the middle part of a bunch.

The sender wrote that he felt certain that cold weather had nothing to do with the matter. It was apparent that the disease had attacked the fruit at an early stage of its existence.

Later, the fungus fruited freely on the main stem of the bunch of bananas. The facts observed seemed to establish the ability of the fungus to prevent completely the fructification of the banana.

A considerable number of fruits suffer from ripe-rots, caused by different species of *Gloeosporium*. Among the fruits are apple, pear, quince, guava, tomato, egg-plant, etc. Dr. Cobb made a special study of these rots, and came to the conclusion that the fungus causing them was really one and the same in each case. He conducted a number of cross-infection experiments with successful results. For instance, he inoculated bananas, tomatoes, mangos, etc., with spores of the ripe-rot fungus of the apple, with the result that these fruits were infected and became diseased.

Diseased fruits should be removed and destroyed as soon as the rot is noticed, as otherwise the whole bunch will soon be infected and destroyed.

Pod Diseases of Cacao.

Three cacao pod diseases are known in the West Indies, but only two of them are of great practical importance. These are the 'Trinidad pod disease' caused by the fungus *Phytophthora omnivora*, and the 'brown-rot' caused by *Diplodia cacaicola*. This latter is the same fungus that causes the 'die-back' disease of the stem.

The *Phytophthora*, as its specific name implies, attacks a large number of plants, mostly seedlings; it is a marked parasite. The *Diplodia*, on the other hand, is distinctly a facultative saprophyte, and is capable of growing on a large variety of dead substances, including dead cacao twigs, the dead husks of the pods, etc.

Pods attacked by *Phytophthora* turn dark in colour. The

darkening generally starts at one end, and in a few days, under favourable conditions, spreads over the whole pod. A white mould makes its appearance, after a time, on the surface of the pod. It generally appears first in the furrows. This white mould represents the reproductive organs of the fungus. Numerous spores (conidia) are produced on this mould, and these are carried by wind, etc., to other pods, which in turn become infected. The conidia are large, egg-shaped, colourless, and one-celled.

The fungus mycelium spreads through the whole of the inner tissues of the pod, even attacking the seeds. Resting spores, capable of retaining their vitality for a considerable time, are produced in the diseased tissues. The conidia produced externally are delicate and soon die unless they are carried to a spot suited for their germination.

The brown-rot also starts as a small brown patch on the pod, generally either at the insertion of the stalk or at the free end. In from six or ten days later the pod is destroyed. The mycelium of *Diplodia* also spreads to the interior of the pods. It destroys the tissues both of the pod itself and of the seeds.

So far the two diseases are very similar; the two fungi differ, however, markedly in their methods of reproduction. The spores of *Diplodia* are formed in small chambers under the skin of the pod. Large numbers of them are produced in each chamber, and finally the pressure on the skin becomes so great that it is ruptured. The spores are expelled as small heaps of black powder. On microscopic examination they are seen to be elliptical in shape, dark-brown in colour, and two-celled. The two fungi also differ in their vegetative hyphae, those of *Diplodia* being septate, while those of *Phytophthora* are without septa.

In dealing with both diseases, the most important remedial measure is the burying of all dead husks or shells instead of leaving them on the surface of the soil to decay. In the case of *Phytophthora*, this measure destroys the resting spores by which the fungus passes over from one season to another. In the case of *Diplodia*, it destroys a convenient breeding ground for the fungus. At the recent Agricultural Conference, Mr. J. H. Hart, F.L.S., stated that on one estate in Trinidad, this treatment, systematically carried out, had resulted in an increased yield of 25 per cent.

Diseased pods, also, should be removed and buried or burnt as soon as noticed. They will give no yield, and only serve as a source of infection for other pods.

Severe local outbreaks of *Phytophthora* could be checked by spraying the young pods in the affected locality with Bordeaux mixture at intervals of, say, ten days.

In all probability, both diseases occur in all cacao-producing colonies in the West Indies. The relative abundance of the two appears to depend on local conditions. In Trinidad and British Guiana, for instance, *Phytophthora* is the more abundant and destructive. A very humid atmosphere probably would favour *Phytophthora* more than *Diplodia*. It would be interesting to have accurate observations on the relative abundance of the two diseases in Grenada, where cacao is grown without shade, and where, consequently, the atmosphere, round the pods, is less humid than in Trinidad.

In Surinam, there is another serious pod disease, caused by the same fungus as that causing the witch broom disease. The disease is known to the Dutch planters as 'versteening' (petrification). The fruits show first a discoloured patch, which later becomes black. They are distinguished from those attacked by other diseases by their hardness, which is seen at once if they are cut.

DETERIORATION OF POTATOS.

The Scientific Committee of the Royal Horticultural Society has had under discussion the subject of the deterioration of potatoes. The following summary of the discussion appeared in the *Gardeners' Chronicle* of May 20. Many of the points raised apply also, to a greater or less extent, to all plants propagated by buds, and the summary is therefore reproduced as likely to be of interest to agriculturists in the West Indies:—

I. Do potatoes deteriorate? It is important to note that deterioration may take place from a commercial point of view, or from actual degeneration of the plant itself. (See II. below.)

1. In the broad sense they undoubtedly do deteriorate.
2. But deterioration, *per se*, also seems to occur. E.g., 'Buffs' and 'Dons,' previously good, succumbed to disease in 1845. 'Victoria' degenerated in time both as a cropper and in disease-resisting power. 'Dunbar Regent,' with its acknowledged excellent qualities, can have disappeared for no other reason than because it had deteriorated. Varieties degenerate sooner or later both in productiveness and resistance to disease, sometimes in as short a period as six years from the raising of the variety.

II. What are the evidences of deterioration?

1. As shown by the plant itself.—(a) The leaves grow curvy and stunted. (b) The plant does not develop properly, or (c) even fails to appear above ground at all. (d) The plant offers less resistance to disease (in eight years a reputed disease-proof variety became much diseased).
2. From the growers' point of view.—(a) The produce is much lessened (in one case cited by 50 per cent. after two years) when grown on the same soil. (b) The size of the tuber is reduced ('in fifteen years the potatoes were no larger than marbles').

III. Why does deterioration occur?

1. It may be brought about by local conditions.
 - a. Treatment.—(1) Wintering tubers under conditions causing premature sprouting. (2) Growing continuously on the same soil. (3) Unsuitable manuring. (4) Possibly by selection of small tubers (but this is by some regarded as unlikely).
 - b. Economic reasons.—(1) Supplanting by varieties of greater productiveness or other desirable quality. (2) Ease with which new varieties are raised. (3) Novelty of later-raised varieties.
2. But it is also due to inherent causes.—(a) Old age or disturbance in the balance between waste and repair. (b) Possibly the tendency to form seed, but there is a marked exception in the Ashleaf. (c) The potato is an exotic, and is, therefore, never grown under absolutely natural conditions. It may be that even after 300 years' cultivation it has not become completely adapted to, or in harmony with, its environment.

IV. How is the fact that certain varieties (e.g., Ashleaf, Early Rose, Magnum Bonum, Maincrop) do not appear to have degenerated after long cultivation to be explained in view of the foregoing facts? It is probable that newly-raised varieties vary in vigour as well as in other characters, some having sufficient vigour to carry them through only six years, others through very many. Cross-fertilization, as a rule,

results in the production of longer-lived varieties than does self-fertilization.

V. Points of practical importance. How may the life of a variety be prolonged?

1. Greater care should be exercised by raisers in introducing new varieties. Only those with plenty of initial vigour should be offered to the public.
2. Well-matured tubers should be chosen for 'seed.' Size of seed is not so important, but uncut tubers of medium size give, in the long run, the best results.
3. Selection of tubers in other directions can be expected to give little result, but 'sports' do occasionally occur, but are usually of no practical value.
4. Sets should be stored so that they do not exhaust themselves by premature sprouting.
5. The seed should be frequently changed; the best seems to come from Scotland, but even there change of soil seems necessary. The second year's crop is usually the best.
6. Probably excessive manuring with nitrogenous manures may lead to more rapid degeneration.

VI. The main objections to the idea of degeneration naturally occurring in asexually-produced varieties were (1) the fact that some varieties persist apparently unchanged for long periods—this point is dealt with in paragraph IV.; and (2) the idea that plants produced asexually are entirely new individuals, and not merely parts of one individual; this question cannot be regarded as definitely settled.

VII. Other points. The discussion also brought out a considerable body of facts regarding other plants of great use and interest, and provided suggestions for a very large amount of experimental research.

RUBBER IN BRITISH GUIANA.

The *Demerara Argosy* of May 20 contains an account of an expedition into the interior of the colony under Dr. Bovallius, a rubber expert. Dr. Bovallius spent some four months in the interior with the view of making inquiries into the prospects of exploiting rubber in the colony. He made the following statement in reference to British Guiana rubber trees:—

I found different species of trees yielding good quality of rubber, but I regret to say that up to the present I have not found enough, the trees being scattered over wide areas. The rubber is undoubtedly good, and we may be able to devise the right method of curing it for the market. It cannot, however, be treated in the same way as the very same rubber in Brazil, for the conditions are different. The land between Ireng, Echilebar, Arnik, and Upper Potaro forms the grant I applied for, but I have examined only a comparatively small part of this tract, which covers thousands of square miles. It is too early for me to speak of the possibilities of a permanent exploitation in that part of the interior. What I know is that the rubber is of satisfactory quality, that the labour supply is there, and that the climate is good.

Sisal in Hawaii. The sisal plantation started by the Hawaiian Fibre Company has now about 750 acres planted in sisal. To quote a report of that company recently published: When first started the company represented an investment of about \$37,000 (say, £7,400), but later, owing to the success of the enterprise, the company increased its capital to \$75,000 (say, £15,000). It is expected that the area of the plantation will shortly be considerably increased, if not doubled.

WEST INDIAN PRODUCTS.

Canada.

The following report, dated Montreal, May 9, on West Indian produce in the Canadian markets during the month of April has been received from Mr. J. Russell Murray:—

The opening of navigation on the St. Lawrence on the 3rd. inst. marks the beginning of the more active months of business of this year. All lines of business indicate prospects for a good year. Immigration is very heavy this year both from Europe and from the Western States to the North-West Territories. Inquiry is fair for the general commodities, and wholesale houses are now very busy delivering the spring orders.

SUGAR.

Since my last report, of April 9, the market for European beets has undergone a collapse which completely stagnated importing business. The beginning occurred about April 18, and the oscillation continued for a week without any effect on cane sugars, but the 15th. saw the break from 15s. 6d. to 15s. 3d. for 96° centrifugals, and 15s. to 14s. 9d. for 89° muscovados. No change was experienced here until the 19th., when buyers turned down the existing offers of British West Indian sugars. The beet market then showed further signs of weakening, and on the 20th. 13s. 6¼d. was recorded, and a decline in 96° centrifugals of 3d. was again experienced. Buyers retired and refiners refused all bids. The Easter holidays added to the stagnation, and the 26th. saw beets down to 12s. 10½d., and the 29th. to 12s. 6¾d., with 96° centrifugals, 14s. 6d.; and 89° muscovados, 14s. A recovery took place on May 1, to 12s. 10½d., and 13s. 0¾d. followed on the 2nd., but on the 5th. a break again took place to 11s. 10½d., and 96° centrifugals broke to 14s. 3d., and muscovados 89° to 13s. 6d. At this date Barbados offerings here at \$2.50 for 89° muscovados were declined, as also all offers made of 96° over \$3.25, and no business seems likely until the market settles. At date, beets have moved up to 12s. 3d., and if this holds business will be possible for British West Indian sugars. Much business and money have been lost to the British West Indies owing to inflated ideas on prices, and it is not likely we shall see a return of the prices of a month ago. Two steamers are due here shortly with sugar.

MOLASSES.

The wholesale trade of Montreal has bought very little Barbados molasses this year, owing to the high prices ruling, which placed them beyond the range of the buyers who use them. The result has been that a fair quantity of muscovado molasses has been sold at 26c. to 28c. per gallon. The trade does not believe that the high prices have been solely caused by scarcity, but by speculation, and the fall in prices recently of 3c. per gallon is looked upon as speculators selling out, and encourages the idea of still lower prices. Again, the islands are losing ground by creating an opportunity for others to come into the market. New Orleans is reported as shipping 3,000 puncheons to Halifax, and no doubt much of this will find its way into markets under various names. The adulteration of Barbados molasses has been discussed by the trade, who will loyally support any action taken in the matter.

COCOA-NUTS.

This market remains steady, though the New York market has seen a very heavy decline. Business continues

moderate, though the approach of the summer weather may check consumption.

SPICES.

Demand for spot is good. Black and white pepper are in moderate demand. Nutmegs are steady. Ginger, Jamaica unbleached—we have several inquiries for new crop, prices steady.

FRUIT.

Pine-apples and bananas are again in prominence and business is active.

EDUCATIONAL.

Agricultural Education in St. Lucia.

The report of the Magistrate of Districts II and III of St. Lucia, for 1904, has the following reference to agricultural education:—

In my last report I referred to the good that would be done by regular instruction in agriculture in all the village schools. I am now inclined to suggest that the juvenile boys' schools at Soufrière and Vieux-Fort should be from first to last agricultural, industrial, and commercial; the masters should be selected by the Government and should be men of much higher standard than the present.

These schools need not be free. The infant schools should bring boys up to the third standard free; any higher education would be obtained in the juvenile schools on the payment of a small fee.

The boys should be taught from their earliest years that their future welfare depends upon their knowledge of agriculture and commerce, and their ability to develop the natural resources of their country, and not upon that which is being taught them by their parents, the digging of gold in the back woods of other countries where, as a rule, they will acquire but little gold and a considerable amount of vicious, dissolute principles.

Proposed Agricultural School for Grenada.

In the *Agricultural News* (Vol. IV, p. 158), in discussing agricultural efforts at Grenada, it was stated:—

In view of the large number of small proprietors existing in the island (11,452 with holdings between 5 acres and 50 acres each) what Grenada appears specially to require is a good Agricultural School where youths could receive a sound practical training and thus be fitted for taking charge of numerous properties that are, at present, in danger of being abandoned owing to careless and ineffective methods of cultivation.

In a letter addressed to the Governor by the Secretary of State for the Colonies (Grenada, No. 28 of April 6, 1905, published in the *Government Gazette* of May 10, 1905) the fifth paragraph reads as follows:—

In my St. Vincent despatch No. 57 of November 8, 1904, I pressed upon you the desirability of establishing an Agricultural School at Grenada. I hope that you will have discussed the question with Sir Daniel Morris on the occasion of his recent visit, and I should be glad to learn that the Legislative Council had agreed to make the necessary provision.

MARKET REPORTS.

London,—May 23, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' May 23; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 19, 1905; and 'THE PUBLIC LEDGER,' May 20, 1905.

ALOES—Barbados, 15/- to 45/-; Curaçoa, 13/- to 45/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
 BEES'-WAX—£7 5s. to £7 12s. 6d. per cwt.
 CACAO—Trinidad, 56/- to 61/- per cwt.; Grenada, 53/- to 54/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 38/- to 39/- per cwt.
 COTTON—West Indian Sea Island, medium fine, 12½d.; fine, 13½d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—5/- to 7/- per bunch.
 ORANGES—8/- to 12/6 per case.
 PINE-APPLES—Antigua, 14/- to 17/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, good to fine, 59/- to 67/6; low middling to middling, 44/- to 55/-; ordinary to good ordinary, 35/6 to 43/- per cwt.
 HONEY—16/- to 29/- per cwt.
 ISINGLASS—West Indian lump, 2/5 to 2/9; cake, 1/- to 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/5 to 1/6 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair to good pale, 1/3 to 1/5; red, 1/1 to 1/2 per lb.
 NITRATE OF SODA—Agricultural, £11 5s. per ton.
 NUTMEGS—66's 1/3; 70's, 1/-; 80's, 10½d.; 92's, 9d.; 122's, 5¼d. per lb.
 PIMENTO—2¾d. per lb.
 RUM—Demerara, 1s. 3d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.
 SUGAR—Yellow crystals, 17/6 to 19/6 per cwt.; Muscovado, Barbados, 19/- to 19/6 per cwt.; Molasses, 12/6 to 16/6 per cwt.
 SULPHATE OF AMMONIA—£12 13s. 9d. to £12 15s. per ton.

Montreal,—May 9, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 35c.; Antigua, 30c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 19c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5c. to 5¼c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey crystals, 96°, \$3.19 to \$3.35 per 100 lb.
 —Muscovados, 89°, \$2.43 to \$2.50 per 100 lb.
 —Molasses, 89°, \$2.00 to \$2.25 per 100 lb.
 —Barbados, 89°, \$2.10 to \$2.30 per 100 lb.

New York,—May 12, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 11¾c. to 11¾c.; Trinidad, 12c. to 12½c. per lb.
 COFFEE—Jamaicas, 8½c. to 9c. per lb. (ex store).
 GINGER—Jamaica, 6¼c. to 6½c. per lb.
 GOAT SKINS—Jamaicas, 57c. to 60½c. per lb.
 GRAPE FRUIT—Jamaicas, \$5.00 to \$6.00 per barrel.
 HONEY—39c. to 41c. per gallon.

MACE—West Indian, 30c. to 34c. per lb.
 NUTMEGS—West Indian, 110's, 14c.; 80's, 21c. per lb.
 PIMENTO—4½c. per lb.
 PINE-APPLES—\$1.50 to \$2.50 per case.
 SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3¾c.; Molasses, 89°, 3¾c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 31, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—24c. per gallon, package included.
 SUGAR—89°, \$2.10 per 100 lb.

Barbados,—June 3, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.60 per 100 lb.
 CACAO—\$12.50 to \$13.11 per 100 lb.
 COCOA-NUTS—\$11.50 per M. for husked nuts.
 COFFEE—\$10.00 to \$11.75 per 100 lb.
 HAY—\$1.05 to \$1.10 per 100 lb.
 MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$55.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 MOLASSES—22c. per gallon.
 ONIONS—Madeira, \$2.25 per 100 lb.
 POTATOS, ENGLISH—\$2.25 to 2.67 per 160 lb. (retail).
 RICE—Ballam, \$4.40 per bag (190 lb.); Patna, \$3.25 per 100 lb.
 SUGAR—Muscovados, 89°, \$2.00 per 100 lb.

British Guiana,—June 1, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
 CACAO—Native, 11c. to 14c. per lb.
 CASSAVA STARCH—\$5.00 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Rio and Jamaica, 13¼c. to 14c. per lb. (retail).
 —Creole, 12c. per lb.
 DHAL—\$3.30 per bag of 168 lb.
 EDDOES—72c. to \$1.00 per barrel.
 MOLASSES—Vacuum pan yellow, 16c. per gallon (casks included).
 ONIONS—Tenerife, 3¼c. to 3½c. per lb.
 PEA NUTS—American, 5½c. per lb. (retail).
 PLANTAINS—12c. to 32c. per bunch.
 POTATOS, ENGLISH—\$2.50 per barrel (retail).
 RICE—Ballam, \$4.20 to \$4.25 per 177 lb.; Creole, \$4.00 per bag.
 SWEET POTATOS—Barbados, \$1.20 per bag; \$1.32 per barrel.
 TANNIAS—\$1.20 per barrel.
 YAMS—White, \$2.00 per bag.
 SUGAR—Dark crystals, \$3.20 to \$3.25; Yellow, \$3.50 to \$3.70; White, \$4.50 to \$4.75; Molasses, \$2.60 to \$2.80 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—June 1, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.60 to \$11.75; estates, \$12.00 to \$12.25 per fanega (110 lb.); Venezuelan, \$12.35 to \$12.60 per fanega.
 COCOA-NUTS—No quotations.
 COCOA-NUT OIL—7½c. per Imperial gallon (casks included).
 COFFEE—Venezuelan, 9c. to 9¼c. per lb.
 COPRA—\$2.75 per 100 lb.
 ONIONS—West Indian, \$1.85 per 100 lb. (retail).
 POTATOS, ENGLISH—85c. to \$1.05 per 100 lb.
 RICE—Yellow, \$4.25 to \$4.40; white, \$4.60 to \$5.60 per bag.
 SUGAR—White crystals, \$4.50; Yellow crystals, \$3.00 to \$3.50; Molasses sugars, \$2.50 to \$3.50 per 100 lb.



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Fumigation of Imported Plants.

IN the *Agricultural News*, Vol. III, p. 74, the necessity for the adoption of a careful and systematic scheme to prevent the introduction of insect pests into the West Indies was strongly urged. It was shown that most of the serious

insect attacks, in different parts of the world, had been due to the importation of pests from other countries, where, owing to their having been kept in check by natural enemies, or from other causes, their effect on the crops had been insignificant.

In June 1904 a circular was prepared under the direction of the Imperial Commissioner of Agriculture, containing information with regard to the laws that had already been passed in Jamaica, British Guiana, and Dominica, for the purpose of preventing the introduction of insect pests. This circular was sent to the Governments of those islands throughout the West Indies in which no definite action had, at that time, been taken. Since then considerable progress has been made in the matter of providing for the fumigation of imported plants.

Dominica has repealed a law previously in force and, on July 27, 1904, passed a very concise and efficient Ordinance, based on that of Jamaica, requiring all imported plants to be fumigated.

At St. Kitt's-Nevis and Antigua it is proposed to fumigate all plants imported by the Imperial Department of Agriculture, as well as any plants that importers may request to have fumigated, and later to pass an Act to make such fumigation compulsory.

In St. Vincent an Ordinance has been passed (April 8, 1905) repealing the Act of 1895 and giving the Governor the power to require all imported plants to be fumigated. A site for the fumigation chamber has been chosen, and as the requisite funds are

available, it is likely that the necessary buildings will soon be erected.

In Barbados fumigating chambers have been built. The Trade Act has been amended, giving the Governor-in-Executive Committee power to prescribe the conditions under which alone plants may be imported into the colony. Rules and regulations have been drafted to be submitted to the Governor-in-Executive Committee, and these will probably soon be in active operation.

Inquiries have been received at the Head Office of the Imperial Department of Agriculture from Grenada, St. Lucia, and Montserrat, and it is hoped that definite action will soon be taken in the matter in these colonies.

It will thus be seen that the importance of legislation for preventing the introduction of insect pests has been fully appreciated, and that the fumigation of imported plants is now becoming general throughout the West Indies. There has been no friction because public opinion had already been educated in its favour, and with the hearty co-operation of the planting community there has now been established in the West Indies an important piece of machinery for the advancement of agricultural interests.

The position at one time taken up in regard to the necessity for definite action with a view to keeping out undesirable insects was that there was already, in some of these colonies, such an abundance of insect pests that the introduction of a few more could have little or no effect. The folly of holding to such a position will be realized by any one who reads Mr. H. Maxwell-Lefroy's paper in the *West Indian Bulletin* (Vol. III, pp. 140-51) containing 'Suggestions for controlling the importation of insect pests.' It is shown, first of all, that a large proportion of the insect pests, especially scale insects, known in the West Indies, have been introduced from other parts of the world. Then evidence is given of the danger of insects spreading from one island to another. The interesting table on p. 143 shows how many of the 120 species of scale insects, known to occur in the West Indies, are to be found in each island. Similarly with other pests, it is shown that they are very unequally distributed, and the necessity is urged for confining them within the closest possible limits.

What it is especially desired to impress upon all concerned in this matter is that each island may, at

present, be said to rejoice in the absence of certain undesirable insect pests known to occur in other parts of the West Indies. It behoves such islands, therefore, to do all in their power to keep out these insects, which might, if introduced, prove a very serious menace to agriculturists. The probability is that these pests, in new districts, and in the absence of such natural enemies as have, to some extent, kept them in check elsewhere, would find their new surroundings entirely congenial, and would therefore increase rapidly, and be liable to do considerable damage.



SUGAR INDUSTRY.

Seedling Canes in St. Kitt's.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following note on seedling canes:—

The following facts with reference to the yield of a field of canes planted in the variety known as D. 116 have been furnished me by Mr. Shelford, who is in charge of Estridge's estate in this island:—

The field was $8\frac{1}{2}$ acres, part manured with pen manure, and the remainder cattle staked.

The variety of cane planted was D. 116, at the end of February 1904. The canes were reaped at the end of May 1905 and gave 48,500 gallons of juice, which yielded $26\frac{1}{2}$ tons of muscovado sugar.

The canes were tall, straight, and free from trash. Mr. Shelford writes: 'This cane grows so well here, that I think it suits this locality, and I intend to put in all I can.'

I am also informed by Mr. J. S. Somerville, the owner of Cunningham's estate in this island, that 4 acres of canes planted in B. 208, gave a return of 15 tons of muscovado sugar.

Cane Farming in Trinidad.

Brief mention was made in the last issue of the *Agricultural News* (p. 188) of a meeting of proprietors of sugar estates in Trinidad held at the West India Committee Rooms at which the subject of cane farming was discussed. The following summary of the proceedings is extracted from the *Port-of-Spain Gazette*:—

Considerable discussion took place with regard to farmers' canes, and the price at which these should in future be bought, so as to allow of farmers obtaining full value for their canes whether markets fluctuate or not. It was ultimately decided that the sliding scale should be adopted and tried as from next crop. An agreement was then and there drawn up and signed by the proprietors. Briefly its provisions are these:—

1. The agreement to be in force for one year, and then renewed for another and subsequent year.

2. The following sliding scale to be the basis upon which farmers' canes are to be bought :—

Price in New York, duty paid.	Price to be paid for Canes.
3 $\frac{7}{8}$ cents	\$2.06 per ton.
4 "	2.20 " "
4 $\frac{1}{8}$ "	2.27 " "
4 $\frac{1}{4}$ "	2.34 " "
4 $\frac{3}{8}$ "	2.41 " "
4 $\frac{1}{2}$ "	2.48 " "
4 $\frac{5}{8}$ "	1.55 " "
4 $\frac{3}{4}$ "	2.62 " "
4 $\frac{7}{8}$ "	2.69 " "
4 $\frac{1}{2}$ "	2.76 " "
4 $\frac{9}{16}$ "	2.83 " "
4 $\frac{5}{8}$ "	2.90 " "
4 $\frac{11}{16}$ "	2.97 " "
4 $\frac{3}{4}$ "	3.04 " "
4 $\frac{13}{16}$ "	3.11 " "
4 $\frac{7}{8}$ "	3.18 " "
4 $\frac{15}{16}$ "	3.25 " "
5 "	3.32 " "

Maximum price to be paid, \$3.32 ; minimum, \$2.06.

3. The agreement does not apply to those who supply more than 1,500 tons of cane in any one season ; with such persons proprietors may make their own arrangement.

4. The average price each fortnight to be decided upon by the following Committee who will be asked to act as such, viz., his Excellency the Governor, the Hon. the Colonial Secretary, the Hon. the Attorney General, and the Hon. A. P. Marryat. The daily quotations in the public telegrams to be the basis, the previous fortnight's average price of crystals in America being the guide.

5. A promissory note of the value of £1,000 sterling to be signed by the parties to the agreement, and handed to his Excellency the Governor, before crop starts, it being considered security for any penalty imposed by the Committee for any breach of the agreement which has been proved. Fines levied to be awarded by the Committee to the parties injuriously affected.

6. Whether delivered at the factory or loading station, the price of canes to be the same rate.

7. Any party wishing to withdraw from the agreement to give six months' notice in writing to the Committee, prior to December 31 in such year.

Porto Rico.

It will be seen from the following extracts from the *Consular Report* on Porto Rico for 1904, that the position of the sugar industry is entirely satisfactory :—

The sugar crop of 1903-4 yielded 116,000 tons, the heaviest ever recorded in Porto Rico. It is the result of the great development of the sugar centrals in the last few years now arriving at their proper condition of efficiency. The value of the crop was £786,245 more than that of the previous year. Two new centrals came into work during the year, one at Juncos and the other at Naguabo, while a third is planned for next year at Fajardo. Nearly all the old factories of any importance have improved their plants and systems, and great activity is shown all round in opening up new cane areas to supply the growing capacities of the mills.

According to the annual report of the Central Aguirre the result was satisfactory, and although the average price at which the crop was sold was only 13s. 9d. per 100 lb., a net earning of £51,800 was obtained, giving a dividend of

£26,700, or about 6.67 per cent. on a capital of £400,000. The crop of this factory was taken off in 131 working days, at an average run per day of twenty and a half hours ; the average amount of cane per day was 1,216 tons ; average extraction of juice was 80.43 per cent. of the total weight of cane. They have under cultivation for next year about 7,500 acres of cane, and expect a yield of about 20,000 tons.

A French company under the name of 'Compagnie des Sucreries de Porto Rico,' with headquarters in Paris, has been incorporated with a capital of about £180,000. They have bought five plantations in this district, in all about 2,500 acres, and have built up a central factory which they call 'Central Fortuna.' The factory is situated about 5 miles from Ponce. The capacity of the mills is about 600 tons of cane per twenty-four hours. The novelty about this factory is that they are putting up a new system of diffusion of bagasse, which, it is asserted, will increase the extraction from canes fully 2 per cent. This is the first time that this system of diffusion has been undertaken on a large scale, the inventor himself, a French chemist by name H. Manoury, being the general director of the central factory and of the Compagnie des Sucreries de Porto Rico in this city. The first crop under this new system will be taken off next year.

Cuba.

The *Demerara Argosy* of June 10 contains an interesting account of a visit paid to Cuba by Mr. John Wilson, of plantation Uitvlugt, from which the following brief extracts are taken :—

The United Fruit Co.'s estate, Banes, makes a crop of 25,000 tons. The factory was built five years ago at a cost of \$800,000, the total outlay on the estate being \$4,000,000. The land under cultivation consisted of 14,000 acres in cane, and 4,000 acres in bananas. This estate has 50,000 acres of land, all good cane land.

The canes grown are mostly what are known as the 'Crystallina' cane ; a small nursery of seedling canes has been established ; B. 208 seemed the most promising in the nursery. The cane rows on this estate are planted 6 feet by 6 feet and give good results. Canes ratoon in a remarkable manner, the shoots hardly ever failing to spring after cutting.

The soil in Cuba is so rich that little or no cultivating is required to grow canes to make from 2 to 3 tons of sugar per acre, but an attempt is being made to cultivate more highly and raise the returns. Motors to work cultivators are being introduced, and re-planting is to be gone in for on a more systematic scale. Some fields on Isabel estate were pointed out as having been in cane for fifty years without re-planting or cultivating in any way beyond cleaning. No artificial manure is applied in the east end of the island, but on the older estates in the Cienfuegos district some artificial manure is being applied.

Cane farming is largely carried on, and canes are purchased at a fixed rate per ton. The land generally belongs to the estate and is given out to contractors in plots of 50 acres and upwards, who grow and cut the canes and deliver to the factory. Day labour is dear and costs \$1.00 per day for an able-bodied man.

Sugar in Cuba can be produced on all well-equipped estates at 1½c. per lb.

For Demerara to keep pace with Cuba everything possible must be done in labour-saving appliances, such as the introduction of mechanical cane transporters and cane hoists. The vertical cane hoist in use in Cuba looks to me feasible for adoption in Demerara.



WEST INDIAN FRUIT.

TRINIDAD MANGOS.

Mr. Algernon E. Aspinall, Secretary of the West India Committee, has written to the Imperial Commissioner of Agriculture that he recently sent a large case of mangos from the Trinidad Court of the Colonial and Indian Exhibition to the King and received the following very gratifying reply:—

Buckingham Palace,
June 5, 1905.

Dear Mr. Aspinall,

Your mangos have arrived, and the King desires me to return to you his thanks, especially so to Mr. J. H. Hart.

Yours very faithfully,
(Sgd.) FARQUHAR.

PINE-APPLES IN THE BAHAMAS.

The following note appeared in the *Maritime Merchant* of Montreal for June 1:—

There has been a revival in trade and the pine-apple and orange industries are very prosperous. The island of Eleuthera, situated about 70 miles north of Nassau, is particularly noted for its pine-apple exports, having shipped 250,000 dozen last year. One plantation alone this year had 100,000 dozen for export. The larger portion of the product of Eleuthera is marketed in Baltimore, but it is said the trade relations between the Bahamas planters and the Baltimore buyers are unsatisfactory. A point worth considering is: To what extent could Canada handle the pine-apple crop of these islands? The orange exports of the Bahamas have increased, this improvement being due to the failure of the Florida groves, which enabled British West India oranges to get into the American markets freely in the face of the high duty.

Converting Cacao Pods into Manure. A paper by Professor Carmody on a 'Compost made from cacao pods and lime' is published in the *Proceedings* of the Trinidad Agricultural Society (Paper No. 232). The process of making the compost is described as follows: 'The shells as soon as possible after breaking are put into enclosures, and a thin layer of lime is scattered on them, and then covered over with banana leaves.' The sample of compost examined was found to contain 0.37 per cent. of total nitrogen, 1.55 per cent. of potash, and 0.15 per cent. of phosphoric anhydride. Its value is about 7s. 6d. per ton and considerably above that of local pen manure.

AGRICULTURE IN ST. LUCIA.

The following is extracted from the report in the *Voice of St. Lucia* of the proceedings at a meeting of the St. Lucia Agricultural Society held on May 29:—

A report was read from the Agricultural Instructor on the condition of the Hereford bull inspected by him on April 10 at 'La Dauphine' estate, Soufrière. He found the animal in first-class condition and fit for immediate service, although it was noticeable by the condition of its hide that in the near past it had been allowed to fall off a little in health. The animal was now with Mr. William Low and was reported to be in excellent health. The Committee agreed that it might now be sent to Mr. Hunter at 'Dennerly,' and the acting Secretary promised to superintend its transfer.

It was further resolved to remove the Berkshire boar from Soufrière to the Agricultural School.

The Agricultural Instructor presented a statement of expenditure of £12 as prizes for school gardens. He had personally distributed this money to teachers and pupils, inspected the gardens, and bought and forwarded such implements and materials as were most needed.

AGRICULTURAL PROSPECTS IN ST. VINCENT.

In an editorial on the agricultural prospects of St. Vincent, the *Sentry* of June 16 makes the following reference to the prospects of the cotton industry and minor products:—

The cotton planters are now taking the most favourable advantages which the copious showers of the past month afford for putting in seed, and increasing the area of cultivation, and it is confidently hoped that the present yield of 78,000 lb. of lint, besides selected seed which is also very valuable, 4,000 lb. of which were shipped by last mail to various islands, will again be more than double in the next crop. In addition to the prospects of the cotton industry which is in the hands of the large proprietors, we are also able to report favourably as to the prospects of minor products. Whilst there are already large areas of growing cacao, coffee, and spice trees in suitable localities in the possession of peasant and other middle-class landowners, the officers at the Botanic Station are feeding new applicants all the time with seed and plants. The latest returns show that 30,000 economic plants were sent out from the nurseries last year, which, we understand, is a record for the garden, and which reflects credit on the Agricultural Superintendent and his foreman.



ROSES IN ST. KITT'S.

The following notes on growing Roses in St. Kitt's have been forwarded by Mr. John Belling, B.Sc., Agricultural and Science Master, St. Kitt's:—

The tea, monthly, or ever-blooming Roses grow and flower well in the West Indies. They are evergreen and truly ever-blooming here, though at Christmas the flowers of some varieties become smaller and less double.

Roses are grown altogether for cut flowers. These should be cut in the open bud before the inner petals have turned back; otherwise the hot sun will (in many varieties) curl up the petals and spoil the outline of the full-blown flower.

The tea rose is the only florist's flower extensively grown in the West Indies. It should be kept in mind that for hundreds of years it has been tended by gardeners, and that such attention has now become indispensable to it, and that its roots cannot compete with those of the many sturdy semi-wild plants cultivated in West Indian gardens, which still retain much of their native vigour. Hence the part of the garden for a rose bed should be chosen as far as possible from all other trees or shrubs; for, if on digging up the ground for the roses, roots of adjacent trees are found there, it is certain that they will grow in again and starve out any roses planted there.

Also a site should be chosen where there is free sunlight all day and all the year round; for, if shade comes on the rose bed throughout the winter, as will happen if it is situated to the north of a house or wall, the rose trees will be starved and attacked in their weakened state by mildew and scale, which will prevent them from flourishing next summer.

Rose plants can be obtained from American florists for about 10c. each. The best and cheapest I have seen are from the Good & Reese Co., Springfield, Ohio, at sixteen for \$1.00, with choice of varieties. I have brought them in a well-ventilated basket without losing a leaf after nine days at sea; but if they are packed in nearly air-tight boxes, the leaves usually become rotten. But so long as one joint of the stem is still green, the plant may be saved by cutting off all rotten parts, washing, and potting in sandy soil, putting it in a fairly sunny spot, and not watering too much.

When the rose is 6 inches high it may be planted out. For each rose a hole may be dug 4 feet square and 2 feet deep. This should be filled up with the top soil mixed with pen manure and the ashes from the kitchen. A hole the size of the flower pot is made in the middle. The rose in the pot is well watered, and the earth turned out into the bed and pressed around with the feet. A thick mulch of pen manure or old megass is put on the surface and renewed as it gradually decays.

It is better to soak the soil thoroughly once or twice a week than to water slightly every day.

The chief pruning required is to cut all the flowers and to cut them with long stems. The best roses come on the green suckers from below, so that when sufficient of these have grown the old stems may be cut out. Thin, wiry stems should also be removed. After a year or two most varieties do not give such an abundance of fine flowers as at first. They should then be removed, the soil re-dug and re-manured, and new cuttings planted. Florists who grow for flowers treat the tea rose as an annual.

Rose cuttings grow readily if cut long, and plunged in fresh, clean sand which is kept moist and in the sun. The following varieties, out of many, grow well in St. Kitt's:—

White, Cornelia Cook. *Tinged*, Golden Gate (scented and floriferous), White Maman Cochet. Kaiserin Augusta Victoria. *Light Pink*, Maman Cochet. (Souvenir de Malmaison). *Peach*, La France (scented). *Dark Pink*, Balduin (a rapid grower). *Crimson*, American Beauty (scented). *Yellow*, Perle des Jardins (scented), Maréchal Niel.

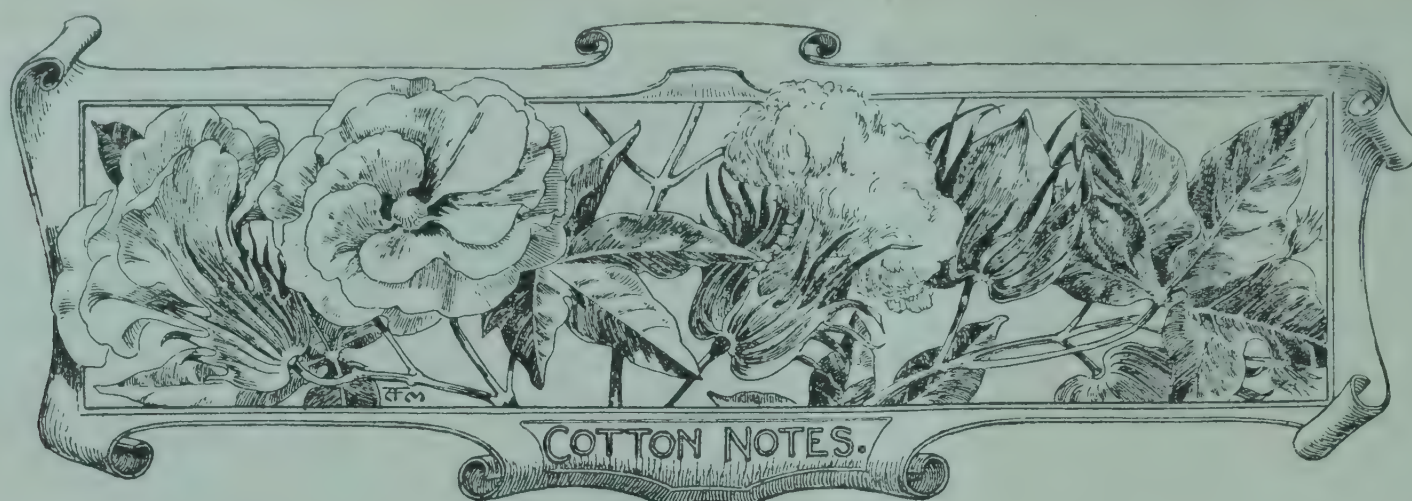
BARBADOS.

Cotton and Banana Industries.

The following is an extract from an address delivered by Mr. J. W. C. Catford on the occasion of his election as member for the city of Bridgetown in the House of Assembly, Barbados, on June 26:—

There was also another pleasurable feature in the case, and that was that through the assistance of the Imperial Department of Agriculture they had two more strings to their bow than they formerly had, which he believed would be of very great advantage to the island. The first of these was cotton. They could grow in the West Indies a class of cotton which could not be grown all over the world. That was the Sea Island cotton, which was the best grown and commanded the highest price. Some people said that, although they got a fairly good price for cotton at present, in a few years more it would not pay. The Barbadian planter was as a rule conservative where any new industry was concerned, but he was at the same time a very level-headed fellow, and when he had succeeded in putting in two or three successful crops of cotton at remunerative prices, he would believe in it just as he now did in sugar. He did not believe there was any fear for the future of the new industry, because Sea Island cotton which was in very great demand could only be grown in limited areas—he believed the only places were the Sea Islands off the coast of South Carolina and a few miles inland in Florida and Georgia. He thought those planters who had land suitable for the purpose should extend their cotton cultivation and in a short time they would find that it was to their advantage to do so. There was another very strong reason why he advocated the extension of cotton growing. There could be no doubt that, at the present time, sugar was of little importance to England, and therefore the colonies producing it were not thought very much of as sugar was being grown all over the world. But if they could supply the manufacturers of Lancashire with cotton, they would be of great importance in the eyes of the English people. Trade, as they knew, was the backbone of England, and if the British colonies produced cotton for the English market, great influences would be enlisted in behalf of these colonies and their interests would be brought a great deal more into prominence than at present.

The second string which they had to their bow was the banana industry. He looked upon that industry as one capable of being made a very valuable addition to the industries of the colony, but it seemed that it had not been taken up to the extent that it might have been. They found the consignee in England continually saying that he had got engagements far beyond the supply received and urging the planters to send more fruit. That should not be. So long as the industry was paying, he thought the agricultural gentlemen of the island should make every effort to meet the market and extend the growing of bananas so as to have some means of keeping their heads above water whenever the prices of sugar became unremunerative.



COST OF GINNING, BALING, AND SHIPPING.

Dr. Francis Watts, C.M.G., has forwarded the following statement showing the expenses incurred in ginning, baling, and shipping a pound of Sea Island cotton at Antigua. The statement is prepared from the returns obtained from the shipment by the R.M.S. 'Esk' on March 8, 1905, of 59 bales (containing 10,735 lb. of lint). The ginning and baling have been charged at 3c. per lb. A similar statement for Barbados will be found in the *Agricultural News*, Vol. IV, p. 130:—

Expenses in England:—			Cents.	
Discount at $1\frac{1}{2}$ per cent.	...	...	402	
Dues	...	...	015	
Quay portorage	...	...	019	
Freight	...	...	1146	
Housing and delivery	...	...	198	
Rent	...	...	017	
Insurance	...	...	024	
Interest and bank commission	...	...	006	
Brokerage at 1 per cent.	...	...	268	2.095
Local expenses:—				
Ginning and baling	...	...	3.000	
Lighterage	...	...	066	3.066
Total expenses	...	...	5.161 cents.	

MANURING COTTON FIELDS.

In *A.B.C. of Cotton Planting*, pp. 57-8, there is a recommendation in regard to chemical manures for cotton as follows:—

In America it is found best to use a general manure containing 20 lb. of nitrogen, 20 lb. of potash, and 60 lb. of soluble phosphoric acid per acre. This may require modification for the West Indies. This could be obtained by mixing 440 lb. of good superphosphate, 40 lb. of good sulphate of potash, and 100 lb. of good sulphate of ammonia. This mixture should be applied at the rate of 580 lb. per acre.

It is best to apply it all in one application at the time of planting the seed. It should be drilled in at a depth of not more than 3 inches and well mixed with the soil.

In cases where it is not possible to afford the cost of the whole of the manure above referred to, it is suggested that one-half the quantity may be applied in each case, namely, 220 lb. of good superphosphate, 20 lb. of good sulphate of potash, and 50 lb. of good sulphate of ammonia. This mixture to be applied at the rate of 290 lb. per acre. The total cost of the half

quantities would be about \$4 per acre, while the cost of the full quantities would be about \$8.

As supporting the recommendations made in the *A.B.C. of Cotton Planting*, the following may be quoted as embodying the result of manuring cotton in Egypt:—

Phosphoric acid, at the rate of 400 lb. per acre applied in the form of soluble phosphate, gives excellent results. It tends to check excessive growth, increases the yield, improves the staple, and hastens maturity.

MANURING OF COTTON.

The Hon. Francis Watts has forwarded the following additional note on the manuring of cotton. It should be read in connexion more especially with the second paragraph of Dr. Watts' article published in the *Agricultural News*, Vol. IV, p. 182:—

While it is essential for successful cotton growing that the soil should be in good tilth and furnished with the necessary plant food supply, it is, on the other hand, necessary to avoid overmanuring, particularly with nitrogenous manures, such as sulphate of ammonia or nitrate of soda, or with farmyard manure. A few instances of this kind have been observed during the past season where the result has been a very vigorous growth of stem and leaf accompanied by a disproportionately small crop of flower, and consequently few bolls and little lint. The lint, too, appears to have suffered in quality, for a crop of cotton grown from Rivers' seed thus overmanured was described as 'clean, bright but coarse staple' and sold at 1s. per lb., while other cotton from the same seed, but not overmanured, was selling at 1s. 2d. At the same time I would point out that overmanuring is not a common fault. I fear, on the contrary, that, as stated by Mr. Lee, cotton is too frequently regarded as a 'botanical "pariah"' (*Agricultural News*, Vol. IV, p. 103).

With regard to the application of organic manures, such as farmyard manure, sea-weed compost, or crushed cotton seed, it should be observed that, as cotton is a rapidly growing crop coming to maturity in a few months, manures of this description must be applied sufficiently early to permit of their thorough rotting and incorporation with the soil at an early stage of the growth of the cotton plant, they should therefore be worked into the soil some time before the cotton seed is sown. Farmyard and similar manures should be used in a well rotted and mellow condition. Planters accustomed to sugarcane, a crop having a long growing period, and one in which the manurial effect of farmyard manure is expected to extend over some two to three years on account of ratooning, are liable to overlook the necessity for the thorough and rapid incorporation with the soil of organic manures in the case of a short-period crop like cotton.

CONFERENCE OF COTTON GROWERS AT ST. PHILIP, BARBADOS.

On June 24, a conference of cotton growers was held at Holy Trinity Schoolroom, St. Philip, at which Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture, was present. His Honour F. J. Clarke presided over a large and representative gathering of the leading planters of the district, including also many small proprietors who evinced great interest in the proceedings.

Sir Daniel Morris expressed his pleasure in meeting the cotton growers of St. Philip, as that parish, a hundred years ago, was an important centre of cotton cultivation, and, he understood, it had already a larger area under Sea Island cotton than any other part of the island.

Since the new industry had been started, a good deal was being learnt as to what was necessary to make it a success. For instance, the land required to be cultivated and manured as for sugar-cane, and Paris green, as a remedy for the cotton worm, was to be at hand to be applied at a moment's notice. Other pests could not be so easily controlled. They had to be dealt with in the general scheme of cultivation; that is, by keeping the plants in vigorous health, and by destroying all old cotton plants as soon as the crop was over. This could be done either by burning or burying them. He was strongly opposed to 'ratooning' Sea Island cotton.

As regards the best time for planting, it was stated that they must adopt the 'old time' practice of planting immediately after 'good' rains in June. If it was not possible to do this in every case, then the earlier the planting was done after June the better. It was desirable that the cotton planters should agree to adopt a general cotton season, and not, under any circumstances, plant 'out of season' cotton. The season suggested was from June of one year until May of the following year. For instance, cotton planted in June or July would give the first pickings in October and November. Second pickings (depending on the rains) should be available late in December and in January, and third pickings in March. If, as is probable, the cotton plants are dried up in April and May, they should then be removed and burnt or buried. *It was important that no old cotton plants should be left in the land or carried over after the end of May.* Any cotton produced after that time would be of comparatively poor quality; and any diseases present would rapidly spread to the new fields.

In reply to the Chairman, Sir Daniel Morris mentioned that by 'ratoon' cotton he meant cotton planted, say, in 1905 that was carried over and allowed to bear at any time after the end of May 1906. If the cotton was planted in June 1905, then by May 1906, it would have been on the land for nearly twelve months. If planted in October 1905, it would have been on the land for eight months. The length of time the cotton was on the land did not therefore determine whether it was 'ratoon' cotton or not. The essential point is that it is not left on the land after June 1 of the following year when the new planting begins. The Sea Island cotton plant apparently yields the best results as an 'annual;' and any departure from this practice was likely to be injurious to the industry.

In summing up, Sir Daniel Morris stated that the planters who were now ratooning Sea Island cotton were incurring a grave responsibility. The cotton to be reaped from such ratoon plants will be inferior in quality and will injure the reputation of the island. The plants, in most cases, would be badly attacked by disease, so that the yield per acre would be

reduced, and finally by retaining these diseased plants on the land the young cotton plants in the district would be attacked, with the result that the main crop to be reaped in 1906 would be reduced both in quality and quantity. Barbados had already lost prestige in regard to prices, and if great care were not taken now at a crucial point in the industry, by exporting a large proportion of 'ratoon' cotton, the island would lose the high position it had hitherto occupied among the cotton-producing islands in the West Indies.

An interesting discussion took place in which the Hon. Dr. John Sealy, Dr. Charles E. Gooding, Mr. W. D. Shepherd, and others took part. The opinion of the speakers appeared to be in general agreement with the views put forth by Sir Daniel Morris.

Mr. H. A. Ballou, Entomologist on the staff of the Imperial Department of Agriculture, exhibited specimens and drew attention to the prevalence of the snow scale (*Chionaspis citri*) on ratoon cotton plants in the district. This circumstance, he mentioned, was strongly in favour of getting rid of the old cotton plants with the view of preventing the spread of the disease amongst the young cotton now being planted.

Sir Daniel Morris then made a brief statement in regard to the formation of a Limited Liability Company of cotton growers to take over the Central Cotton Factory in this island. The terms offered by the Government and the British Cotton-growing Association for their interests in the Factory were regarded as favourable; a general meeting of cotton growers was proposed to be held in July next.

Reference was also made to the existence of cotton stealing as having an injurious effect on the progress of the industry. The general opinion was that the selling of cotton without the production of a certificate by the grower should be made prohibitive; and the buyer of cotton, who did not obtain and file the grower's certificate in each case, should be liable to a heavy penalty.

On the motion of the Hon. Dr. John Sealy, M. L. C., seconded by Dr. Charles E. Gooding, M. C. P., a cordial vote of thanks was tendered to Sir Daniel Morris for his valuable address. A similar compliment was paid to his Honour F. J. Clarke, who, it was stated, had rendered signal service as Chairman of the Cotton Committee; also to the Rev. G. A. J. Frederick (for the use of the schoolroom), and to Mr. J. R. Bovell. The meeting then terminated.

ST. KITTS.

Sir Robert Bromley, Bart., writes to the St. Kitt's *Daily Express* on the cotton industry. The following are extracts from Sir Robert's letter:—

I recently had the opportunity of meeting some of the leading people interested in the cotton trade. These gentlemen impressed on me the necessity for great care in the selection of seed. They said that this was a point to which the greatest attention should be paid in cotton cultivation, and strongly urged that inquiries should be set on foot every season to ascertain where the best seed could be obtained and every effort made to procure it. All the buyers of West Indian cotton that I have met have assured me that if proper care is taken there is no reason why West Indian Sea Island cotton should not have a sure footing in the Lancashire market and even cut out the American Sea Island cotton. The fact that some St. Vincent cotton this year has been better than the American Sea Island cotton proves what the West Indies can do if pains are taken.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue reviews briefly the progress that has been made in connexion with the fumigation of imported plants.

Particulars will be found on pp. 194-5 of a sliding scale of payment which it is proposed to adopt for buying farmers' canes in Trinidad. Notes are also published in connexion with the sugar industry in Porto Rico and Cuba.

An interesting and practical article by Mr. Belling on growing roses in St. Kitt's appears on p. 197.

Notes of particular interest to cotton growers will be found on pp. 198-9. A useful conference of cotton growers was held at Barbados on June 24.

The injurious insects discussed in this issue (see p. 202) are the Egyptian cotton worm (a different insect from that known to West Indian cotton growers) and the fruit fly. In regard to the latter, efforts are being made in various parts of the world to make use of its natural enemies as a means of control.

Cacao planters in the West Indies are likely to be interested in the account on p. 203 of the cultivation of cacao in Samoa; also in the discussion on the disposal of diseased cacao husks.

An interesting account of the Bath Springs at Nevis is reproduced on p. 206. The extracts on p. 207 from the annual report of the Inspector of Schools in Jamaica would appear to indicate that progress is being made in connexion with introducing the teaching of agriculture into the elementary schools in Jamaica.

Cotton Lands at Montserrat.

In view of the extension of cotton growing in the Leeward Islands it may be mentioned that there are areas of land near the town of Plymouth in the island of Montserrat offered for sale, or, if preferred, on lease on advantageous terms to any one undertaking the cultivation of cotton.

The Imperial Commissioner of Agriculture (Head Office, Barbados) will be happy to afford information on the subject.

Anguilla Agricultural Society.

An Agricultural Society has been formed at Anguilla with Mr. C. Rey as Honorary Secretary. At the first meeting, held on June 9, it was proposed by Mr. C. Rey, seconded by the Rev. W. D. Edwards, and carried unanimously: 'that the Honorary Secretary be instructed to communicate with the Imperial Department of Agriculture for information with reference to the preparation of farine from bitter cassava.' During the discussion on this subject it was pointed out that, while the bitter cassava yielded most abundantly in Anguilla and was highly valued as a food, nothing was known in the island of the preparation of farine.

The island of Anguilla is to be congratulated on the formation of an Agricultural Society which is to be wished every success in its endeavours to improve the agricultural interests of the dependency. The society will receive the hearty co-operation of the Imperial Department of Agriculture.

Bermuda Onion Industry.

According to the *Annual Report* recently issued, the onion crop of 1904 was an exceptionally large one, the exports amounting to 387,839 crates and 186 barrels of the value of £74,162. The value of the 1903 crop was £55,620. The average price per crate in 1904 was 3s. 10d., as compared with 4s. 4d. in 1903.

The colony has realized the desirability of securing other markets than those of the United States for its onions, and a Committee of the Board of Agriculture was appointed to superintend the shipment of onions to the principal cities of Canada, the Legislature having voted £1,000 for this purpose. 'The shipments—2,500 crates of onions—were so made at a cost of £520. The sales and all expenses connected therewith showed an actual loss of £230 on the venture. . . The Committee in their report state that, in their opinion, the loss was again due to circumstances of a very unusual character, and they suggest that another effort should be made during the crop season of 1905.'

Reference was made in the last issue of the *Agricultural News* (p. 179) to an attempt to introduce the Bermuda onion into the London market.

The Superintendent of the Public Garden is carrying out experiments that would appear to be of considerable importance to the colony in the production of onion seed. Mr. Harris' object is to obviate, if possible, the dependence of Bermuda on the Tenerife crop. During 1904, 5 tons 8 cwt. of seed were imported from Tenerife, at a declared value of £2,007.

Porto Rico Industries.

An account is given elsewhere in this issue of the sugar industry of Porto Rico. The *Consular Report* for 1904 also records satisfactory improvement in other industries.

The total value of the tobacco industry has greatly increased: it is said that special improvement is noticeable in quality. The exports of oranges continue to increase: their cultivation along the line of railway proceeds with every prospect of success.

The interest in the revival of cotton growing does not appear to have been sustained. This is stated to be due to the superior value of unoccupied lands for cane cultivation, and to the scarcity and unreliable nature of the labour supply. The crop was estimated at 231,554 lb., and its value at £8,786.

The coffee industry is experiencing a serious crisis: the crop was the worst since the cyclone of 1899. The value of this industry has declined from £1,642,710 in 1896 to £250,000 in 1904.

Broom Corn in British Guiana.

The *Demerara Argosy* of June 3 contains an account of an experiment carried on at the Orphan Asylum in growing broom corn and in manufacturing brooms. The experiment has shown that broom corn grows well in British Guiana and is apparently not attacked by insects. The Superintendent of the Asylum suggests that this industry might well be taken up by the small farmers, who, with their families, could do all the necessary work. The brooms should find a ready sale locally at 25c. to 28c. each. The cost of materials for a dozen brooms is estimated as follows: twelve handles, 18c.; 1 lb. of galvanized wire, 6c.; $\frac{1}{2}$ lb. of sole leather, 15c.; and tacks, 2c.; total, 41c.

It would appear that the article produced in British Guiana is quite different from that made in Antigua. The former is evidently a broom such as might be employed for sweeping carpets and work of that sort; at Antigua small clothes' brushes were made. Brushes of this class are in common use in the United States and Canada.

The Imperial Department of Agriculture has given considerable attention to this matter, and a note suggesting the cultivation of broom corn in the West Indies was published in the *Agricultural News* (Vol. I, p. 268). During 1902 trials were made at the Antigua Botanic Station to ascertain whether broom corn of good quality could be raised under local conditions. Mr. Sands gave an interesting account of these experiments at a meeting of the Agricultural Society on February 6, 1903 (a summary of which was published in the *Agricultural News*, Vol. II, p. 142) when excellent samples of brushes made locally were exhibited.

More recently, attention has been directed towards the possibility of securing a market for these brushes in the United States and Canada. The results of inquiries made were published at length in a recent issue of the *Agricultural News* (Vol. IV, p. 174), from which it would appear that Canada offers a market for this product which might prove profitable.

The Trinidad Fruit Industry.

At a meeting of the Trinidad Agricultural Society held on June 13, a discussion took place on the prospects of the fruit industry. His Excellency the Governor made a statement as to the position of the negotiations with the Symington Fruit Syndicate. The Secretary of State for the Colonies had been in communication with the Syndicate, but it had not been found possible to come to terms. In response to a telegram, he (the Governor) had urged on the Secretary of State that it was most important that there should be no disappointment to fruit growers, who were engaged in producing a large quantity of fruit for shipment. He had endeavoured to get the Royal Mail Company to make arrangements to undertake the carriage of the fruit to England, but no definite information had up to that time been received as to the company's intentions. He had also consulted Sir Daniel Morris as to the best means of securing a market for their fruit. He promised to communicate to the society any further information he might obtain.

His Excellency was thanked for the practical interest he was taking in the matter.

Exports of Trinidad.

The *Annual Report* of the Collector of Customs on the trade statistics of Trinidad for the year 1904-5, recently issued, contains interesting information in regard to the exports of the colony.

The output of sugar shows an increase of 144,000 cwt. in quantity, while a marked improvement in prices added £286,000 to the value. On account of a serious drought, however, the exports did not come up to expectations. The prospects of the industry were, at the time of writing (April 28, 1905), considered bright, and the system of cane farming was receiving an impetus. Molasses show an increase of £5,500.

The cacao crop of 1904-5 was by far the largest ever collected, exceeding the average of the four previous years by 64,000 cwt., or 21 per cent. Prices, however, were comparatively low, and the total value of the exports was £10,400 below that of the previous year. The average prices of cacao, f.o.b. Trinidad, have been for the past three years: 1902-3, 58s.; 1903-4, 55s.; 1904-5, 52s. 6d.

The cocoa-nut industry experienced a favourable year, prices being good. Nuts, copra, and oil are exported: there is also a considerable local trade in oil. It is estimated that 1 ton of copra represents 6,500 average nuts, and 20 gallons of oil, 1,000 nuts. On this basis the exports during the past three years would have been, respectively: 15.4, 18.6, and 17.2 millions of nuts.

A heavy fall of £55,000 occurred on asphalt; the exports of manjak reached 3,428 tons. There was an increase of £2,800 on fish: this was due to shortage in adjacent British islands.

'The fruit trade appears for the first time as promising, but it has had vicissitudes, and its immediate future is uncertain.'



INSECT NOTES.

The Cotton Worm of Egypt.

The cotton worm is the subject of a small pamphlet by Mr. George P. Foaden, published by the Khedivial Agricultural Society. From this it appears that the cotton worm of Egypt is quite different from that of the West Indies. Its name is *Prodenia littoralis*.

The female moth lays the eggs on the lower leaves of the plant, one or two leaves receiving all the eggs laid by an individual moth, sometimes as many as 200 to 300 eggs being found on a single leaf. The pupa is formed in the ground.

In these points the cotton worm of Egypt differs greatly from that of the United States and the West Indies, the eggs of the latter being deposited singly on the leaves, while the pupa is to be found in a fold of the cotton leaf.

In considering means of combating the cotton worm, Mr. Foaden says: 'The method of picking the leaves and burning them is the best at our disposal.' The height of the Egyptian cotton plant makes it impossible to apply Paris green in the same way that it is applied to the Sea Island and Upland cottons.

In localities where irrigation is practised, the Egyptian cotton worm may be destroyed by flooding the land during the pupal stage, taking advantage of the habit of pupating in the ground.

The Egyptian cotton worm (*Prodenia littoralis*) is very closely related to the West Indian corn ear worm (*Laphygma frugiperda*) which is described and figured in the *Agricultural News*, Vol. IV, p. 90.

The Fruit Fly.

The fruit fly (*Ceratitis capitata*) has for many years been a serious pest in various places, notably in Australia and Southern Africa. A short time ago Mr. Geo. Compere, as agent for the Department of Agriculture of Western Australia, after much travel and careful search, discovered the original home of this destructive pest in Brazil. Here the fruit fly was of so little importance that fruit growers hardly knew of its existence, and Mr. Compere concluded that the reason for this was that the natural enemies of the fly held it thoroughly in check. Accordingly, he took back with him a supply of two of these enemies which seemed to be most influential in the work. These were a species of Ichneumon fly and a species of Staphylinid beetle.

Since that time the Governments of Cape Colony and Natal have sent their Entomologists, Messrs. Lounsbury and Fuller, to Brazil to collect the enemies of the fruit fly for the purpose of introducing them into South Africa.

The fruit fly is known as a pest in Bermuda where the natural enemies do not occur, while in Jamaica it is not a serious pest, being supposed to be kept in check by the Ichneumon fly and Staphylinid beetle, enemies which are said to be the same as the Brazilian species or nearly allied to them.

The Government of Bermuda is making efforts, with the aid of the Director of Public Gardens and Plantations in Jamaica, to introduce and establish the natural enemies of the fruit fly found in Jamaica. The fruit fly has not been reported at Barbados, and evidently is not a serious pest in the Lesser Antilles. Its occurrence, however, in Brazil and in Jamaica and Bermuda would make it seem probable that it occurs also in the other West India Islands, but the fact that it is not a pest would indicate that it is held in check by natural enemies.

The fruit fly attacks a great variety of fruits, among others, the orange, lemon, and fig.

The adult fly lays its eggs just underneath the skin of the fruit. They hatch in a few days, and maggots at once commence to feed on the pulp or flesh of the fruit, which generally fall from the tree before they are fully grown. When the maggots are fully grown, they leave the fruit and pupate in the ground, from which the adult fly emerges later. The adult fly feeds on the juice of injured fruit. The maggot attains a length of about $\frac{3}{8}$ inch; the fly is about $\frac{1}{4}$ inch long.

Many methods of control have been tried, including the gathering at least once daily of all fallen fruit, and covering the trees with fine mesh to prevent the female from depositing eggs in the fruit. Poisoned baits have also been tried and have been attended with some success.

The results of the efforts of the Australian and South African Governments to introduce the natural enemies of this serious pest will be watched with great interest as well as the efforts in the same direction by the Government of Bermuda.

THYMOL FOR WORMS IN HORSES.

In reference to previous notes in the *Agricultural News* (Vol. III, pp. 157 and 236) on the subject of the use of thymol for the treatment of vermiceous diseases of horses, the following extract from Dr. Cousins' report on the Government Laboratory in Jamaica for the year 1904-5 is likely to be of interest.

It will be remembered that Dr. Cousins made arrangements for supplying thymol from the laboratory at the small charge of 2d. per dose:—

The sale of thymol powders for the treatment of worms in horses amounted to 2,304 doses. Highly satisfactory results have been recorded by horse owners in all parts of the island. This remedy is undoubtedly of great benefit to all horse-kind, and experience indicates that every horse and mule in the island would be benefited by a dose every three months.

It is not a specific for bots and will only eliminate them when they have left the stomach, but it is of great benefit for worms of all sorts, and has besides a remarkable effect on the general condition of an animal. A horse with a hard, staring coat and in poor condition will frequently develop gloss and rapidly improve in condition after a dose of thymol powder even when no worms are passed. This service, having passed the experimental stage, has now ceased, and arrangements have been made with Messrs. Kinkead, of Kingston, to supply the public with the preparation at a reasonable price.

It may be mentioned that thymol may be obtained from Messrs. Knight & Co., Druggists, Bridgetown, Barbados, at 9d. per oz. It would be interesting to have the results of the use of thymol in other islands.

CACAO IN SAMOA.

The following interesting account of the cultivation of cacao in Samoa is extracted from the *Consular Report* for 1904:—

Samoa generally is now proved to be altogether suitable in every respect for cacao growth.

Cacao plantations, small and large, are all doing well. This product, although it will live here with the most unfavourable surroundings, requires, where a good crop is expected in five years from the time of planting, much care and attention; for unless the trees are carefully weeded and freed from all scrub and grasses the crop will be much delayed. On this account plantations owned by companies enjoy a great advantage over those started by small proprietors, who, in many instances, are not only unable to procure labour as easily as do the large plantations, but often find it difficult to raise money to pay for labour when they get it. Consequently, in their case trees which would produce heavy crops in five years' growth on the larger holdings bring little return to them for seven or eight years. For this reason, as stated in previous reports, cacao is not a good or even a safe investment for the small capitalist unless he uses it merely as a subsidiary to other less uncertain enterprises. Dr. Wohltmann (the Government 'Auskunft' states) considers that not less than £2,500 are requisite to start a cacao plantation. The managing director of the Upola cacao plantation, placed the cost per acre, from clearing the land to the gathering in of the first crop, at £25 to £50 per acre.

Other drawbacks exist besides the difficulty of obtaining labour. Various diseases, especially where the ground is not kept thoroughly clean, infest the trees, and in Samoa, as in other tropical countries, the rat is a standing menace, for it has been known to eat or damage half the crop on some plantations. However, as the rat is kept down by some planters by means of poison, and also as it does not much frequent places where water is scarce, there is good hope for believing that in time it will be got rid of. The introduction of the mungoose was recommended, but as it appears that eventually he ceases to destroy rats and substitutes for them as his food poultry, sugar-cane, and even cacao pods, this idea has been given up.

A small plantation 20 miles from Apia, to the west-ward, started four years ago, yielded its proprietor at the end of 1904, 6,000 lb. of cacao from 8 acres, worth in Apia 6*s.* per lb. The export of cacao in 1904 was about 20 tons.

The following is extracted from information furnished by Mr. F. Harman, managing director of the Upola Cacao Company, Limited, of Birmingham, and should prove interesting to British capitalists concerned in planting investments:—

'Generally speaking 1904 has been a year of continuous progress, and weather and other conditions have been favourable. We had a rainfall of 157 inches, the maximum (January) being 38 inches and the minimum (July) 4 inches. The trees in all stages of growth have consequently shown a marked advance. We have gathered about 1,000 pods from trees three years old, and we expect a fair crop this year. Experience shows that with adequate labour the current expenses of a cacao plantation can be considerably reduced in the third year, owing to the gradual extermination of the rank weeds and grasses which are so troublesome at first, and, accidents excepted, it is fair to assume, as I mentioned last year, that a plantation of 500 acres can be brought into bearing for £12,500, or £25 per acre, including management, buildings, and all incidentals.'

DISPOSAL OF DISEASED CACAO HUSKS.

A correspondent in Grenada, interested in cacao, writes in regard to this matter as follows:—

Much has been written on the desirability of burning or burying with lime all husks of cacao pods opened in the field. In practice on a large estate this is often extremely difficult to carry out *regularly*.

If these pods were collected and broken in an open field-pen and allowed to rot there, being periodically covered over with grass and trash and trodden in by the cattle, would any germs of disease exist under such conditions and be transmitted again to the soil when the manure was thrown out?

The question is one that interests many planters in Grenada, and I shall be pleased to send your reply to the Grenada Agricultural Society.

The following is a memorandum by the Mycologist (Mr. L. Lewton-Brain, B.A., F.L.S.) on the above:—

If all the pods or husks were perfectly healthy and free from *Diplodia*, there would be no objection to disposing of them as suggested, namely, carrying them to a field-pen where they would be converted into compost. This, I should judge, is not often the case.

If *Diplodia* were present in any of the husks, it would continue to grow and reproduce on the decaying vegetable material. In this case, the fungus would be distributed throughout the cacao when the manure is applied.

The procedure suggested cannot, therefore, be regarded as safe, at least in the majority of cases.

If there would be little difficulty in carrying the husks to a field-pen, I cannot see why there should be much more in carrying them to trenches or pits, where they could be buried with lime and covered over. This is especially so, as the number and positions of the trenches or pits could be regulated according to convenience, while the position of the field-pen would depend upon other circumstances.

The view that I have expressed above is very similar to that expressed by my predecessor in dealing with rind disease of the sugar-cane (*Trichosphaeria*) at the Agricultural Conference of 1901 (*West Indian Bulletin*, Vol. II, p. 52). I quote from his paper as follows:—

'The practice of placing rotten canes in stock pens cannot be too strongly condemned. It is very probable that some of the spores will retain their vitality till the manure is applied to the land, and that many of the spores will be distributed by the animals themselves.'

Dr. J. E. Duerden. The friends of Dr. J. E. Duerden, who was formerly Curator of the Museum of the Institute of Jamaica (and who latterly has been engaged in original research in connexion with the marine fauna of the United States) will be glad to learn that he has been appointed Professor of Zoology at the newly organized Rhodes University College, Grahamstown, Cape Colony. The post is an important one and seems to offer many facilities for good work particularly in connexion with the Fisheries Department. It will be within the recollection of readers of the *Agricultural News* that Dr. Duerden prepared a valuable paper on 'The Marine Resources of the British West Indies' presented at the Agricultural Conference held at Barbados in 1901. It is a source of regret that Dr. Duerden's useful services in connexion with fishery matters could not have been retained in the interest of the West Indian Colonies.



GLEANINGS.

The rainfall at Prospect Camp, Bermuda, for the year 1904 amounted to 55.65 inches. This was 7.82 inches less than the average of the past nine years. Rain fell on 234 days during the year.

Many small settlers in Jamaica appear still to plant by the moon. This is superstitious. Plant in regular seasons and when your soil is in good condition, and never mind the moon. (Jamaica Times.)

The number of bales of cotton imported into the United Kingdom during the seventeen weeks ended April 27, 1905, was 1,480,924. This number included 1,343 bales of British West Indian and 814 bales of British West African.

It is stated in the *Maritime Merchant* that trade conditions in Jamaica have been very bright during the past four months owing to the steady increase of the tourist trade. The season is spoken of as a record one, there never having been such a large number of visitors in any previous season.

Mr. J. Jones writes that the 'Poui' (*Tecoma spectabilis*) flowered at the Dominica Botanic Station this year for the first time. Another tree of this family, *Tabebuia pentaphylla*, raised from seeds obtained from British Honduras, which flowered at the station for the first time last year, is said to rival the 'Poui' in showiness.

Seeds of the Talipot palm (*Corypha umbraculifera*) can be obtained on application to the Curator of the Botanic Station, Dominica. A note on the flowering of a specimen of this palm at the Dominica Botanic Station will be found in the *Agricultural News* (Vol. III, p. 151), where references are also made to other notes in this journal on the Talipot palm.

Sugar is made at the Experiment Station at Tortola for tenants and for persons owning land outside the station. Some 22 barrels were made in this way during the year 1904-5. The station repays itself by retaining one-third of the sugar and molasses. The people are eager to bring their canes to the station, as they get better results from the superior crushing and boiling.

At a meeting of the Royal Agricultural and Commercial Society of British Guiana, held on June 15, Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist, read a paper on 'Diseases of the Cacao Plant.' After giving a general account of fungoid diseases, Mr. Bartlett dealt with the cacao pod disease, the brown rot of cacao pods, the 'thread' disease, and the 'witch broom' disease.

As only a few copies of the first edition of this Department's publication *Nature Teaching* now remain, it may be mentioned that an English edition has been published by Messrs. Macmillan & Co. (see *Agricultural News*, Vol. III, p. 381), price 3s. 6d. It is not yet decided whether a second edition will be published by the Department.

Under the auspices of the League of the Empire, Mr. John Barclay inaugurated on Empire Day a series of lectures on the West Indian exhibits at the Colonial and Indian Exhibition. This was followed by Mr. J. H. Hart, who lectured on the Trinidad exhibits on May 26. Mr. Hart has undertaken to give similar lectures weekly. (*West India Committee Circular*.)

We learn on good authority that the New Trinidad Lake Asphalt Company have made a start in cultivating pine-apples for the export trade; 10 acres of land have been cleared and prepared for 100,000 pine-apple plants which, we understand, if proved to be a financial success, will be extended. Other persons in the Guapo and La Brea districts are already cultivating pine-apples. (*Port-of-Spain Gazette*.)

In his annual report the Superintendent of the Government Reformatory in Jamaica states that the permanent crops, coffee, cacao, and bananas, were much longer in recovering from the effects of the hurricane than was anticipated. The value of the produce reaped in the year 1904-5 was £206 3s. 7d.; in 1903-4 it was £185 18s. 6d.; and in the year before, £364 18s. 9d.

In his last annual report the Island Chemist says: The Fermentation Chemist has been engaged in work in connexion with the Sugar Experiment Station during the year. In the course of his visits to estates, a large number of samples of the various materials and products from the distilleries were obtained, and on his return to the laboratory the Fermentation Chemist was occupied in their study and analysis. (The Jamaica Gleaner, June 12, 1905.)

Dr. Cousins mentions in his annual report that no samples of adulterated bees'-wax were received at the Government Laboratory, Jamaica, during the year 1904-5. He adds: 'It is hoped that the high reputation of Jamaica wax may not again be imperilled by the gross adulteration that was prevalent two years ago.' The adulteration of Jamaica bees'-wax with wheaten flour and corn meal was referred to in the *Agricultural News* (Vol. II, p. 268).

According to the *Consular Report* on Japan for 1904, the exports of camphor showed a decline in quantity of 21 per cent., owing to a shortage in Formosa. The natural product is not seriously threatened by its artificial competitor in its present form. The disappointing output from Japan proper is due to the too early cutting of the branches in the past. Experiments in distilling the product from the leaves only are now in progress.

It is stated in the *Consular Report* on the trade of Bordeaux for 1904, that the total imports of sulphate of copper into France reached 29,657 tons. About nine-tenths of this was used for agricultural and viticultural purposes. The increase over the imports of 1903 was due to the precocious development of the vines caused by a warm, wet spring, which encouraged the attacks of cryptogamic disease, against which sulphate of copper acts as a remedy and preservative.



JAMAICA: REPORT ON THE GOVERNMENT LABORATORY, 1904-5: By H. H. Cousins, M.A., D.Sc., F.C.S., Government Analytical and Agricultural Chemist.

The report states that there was a marked increase in the number of samples dealt with at the laboratory. This increase is due to the development of the work along agricultural lines. During the year the police commenced to check the milk supply of Kingston, and samples were forwarded under the Adulteration of Food and Drugs Law.

A large number of samples of soils were received. A special feature of this branch of the work of the laboratory has been the examination of typical soils of the parish of St. Mary in connexion with the banana manurial experiments.

Some 578 samples of sugar products were dealt with in connexion with the Sugar Experiment Station scheme. 'Arrangements were made to enable any sugar estate, desiring to do so, to submit weekly composite samples of juices and sugar so that the working might be placed under simple chemical control.'

Fifteen agricultural students attended the special educational course at the laboratory during the year. Six students entered for the diploma examination based upon a two-year course of study. The examination was conducted by Professor d'Albuquerque, of Barbados, assisted by members of the staff of the Imperial Department of Agriculture. Three candidates obtained first-class certificates, and three second-class certificates. The results are reported as being considered very encouraging when all the difficulties of the case are considered.

CULTIVATION OF COTTON AND OTHER SUBSIDIARY INDUSTRIES IN BARBADOS: By Edgar Beckett, Agricultural Instructor, British Guiana. Georgetown, 1905.

This is a report by Mr. Beckett on a visit to Barbados in January last, for the purpose of studying the cotton and other subsidiary industries.

Visits were paid to the Government Cotton Factory, Messrs. Thorne's factory, and to a number of estates where cotton is being grown. Mr. Beckett goes thoroughly into all details connected with growing cotton on the estates visited and its preparation for the market.

In regard to the possibility of reviving the cultivation of cotton in British Guiana, he states that good Sea Island cotton can undoubtedly be grown in certain districts of the colony, but whether it can be produced at a profit will depend upon the availability of cheap labour and upon the continuance of high prices for cotton. The scarcity of labour would probably prevent the planters from embarking on the cultivation of cotton; but there should be nothing to prevent small farmers who had suitable soil, provided they were prepared to give constant attention to it.

Mr. Beckett also reports briefly on the banana and onion industries.

Acknowledgement is made of the assistance received from the staff of the Imperial Department of Agriculture.

BARBADOS AT THE COLONIAL EXHIBITION.

The *West India Committee Circular* is to publish a series of articles by Mr. W. G. Freeman, Superintendent of the Colonial Economic Collections at the Imperial Institute, on the several exhibits in the West Indian court at the Colonial and Indian Exhibition. The following is a summary of Mr. Freeman's article on the Barbados exhibit:—

Barbados has sent over a wealth of exhibits, and the products of the colony would have made a much more effective display could the specimens sent have been distributed over a court three or four times the area of that which they now occupy. The Exhibition Committee in Barbados and the Commissioner, the Hon. Forster M. Alleyne, have undoubtedly accomplished their task very satisfactorily, almost all the chief products of the colony being represented by specimens which have evidently been carefully selected, labelled, and packed. Nearly one-half of the total number of specimens exhibited are sugar products, and there is no cause for the complaint, too often to be made against exhibitions of this kind, that everything is shown but the important product of the country. The various grades of crystal sugars, syrup, sugar, and muscovado, the subsidiary specimens of clarified cane juice, massecuite and megass, together with the fresh canes and the photographs of estates, the models of plantation carts with their loads of hogsheads and puncheons bring home to one the local conditions and the main features of the industry, and indicate very clearly its possibilities and limitations.

Tangible expression of the success which has attended the revival of the important cotton industry is afforded by the samples of seed-cotton, lint, and cotton seed from seven estates in the island, and a good summary of the recent activity in this direction is given in the Barbados hand-book.

The new and developing banana industry was worthily represented on the opening day by three magnificent bunches of Barbados bananas, shown by Messrs. William Pink & Sons, of Portsmouth, which afforded irrefutable evidence of the fact that Barbados can produce bananas of first-class quality, and that they can be so packed and transported as to reach this country in the best possible condition.

Pickles and preserves are well represented by a considerable number of specimens.

The flying fish industry is much to the fore with spirit specimens of the fish, models of a fishing boat, nets, and pickled fish from the factory recently opened at Bridgetown. The nature and importance of the flying fish industry of Barbados has never fully been realized in this country, and the specimens form a very interesting exhibit.

The court is also supplied with the current issues of the *West Indian Bulletin*, *Agricultural News*, and other publications of the Imperial Department of Agriculture, which are available to visitors in search of further information regarding recent agricultural work in the colony.

Taken as a whole, the Barbados court affords a good idea of the natural capabilities of the colony. Sugar, on which the fortunes of Barbados have been dependent for the last hundred years or so, appropriately occupies the predominant place and gives the distinguishing character to the whole court. At the same time the more important of the minor industries—cotton and fruit—are well represented, whilst the products of local importance, but which are not likely immediately to figure in the export returns are also shown.

THE BATH SPRINGS AT NEVIS.

The following extract from the *Stamp Collectors' Magazine*, January 1867, on 'The Nevis Stamps and their Designs,' by I. B. Brown, Esq., Postmaster of Nevis, contains an interesting account of the celebrated Bath Springs at Nevis, with special reference to their valuable medicinal properties:—

The device on the Nevis postage stamps is a fac-simile of the great seal of the colony, and represents issuing out of the side of a hill a stream of water which, falling to the ground, forms a pool wherein a sick female is reclining supported with one hand by a companion who extends the other to the presiding genius or nymph of the stream for a bowl which the latter is filling from a pitcher of water drawn from the stream.

There are, about $\frac{1}{4}$ mile from the principal town (Charlestown), certain mineral springs called the 'Bath Springs.' Many years ago the proprietors of the land where some of these springs are situated opened two of tepid and one of hot water: over the latter and one of the former rooms were erected and fitted up for the convenience of invalids, while to the other tepid spring a pipe was affixed for drinking purposes. An hotel of almost palatial dimensions and of very imposing appearance, called the 'Bath House,' with several out-buildings, etc., was erected, and the surrounding grounds were laid out in gardens. There are numerous other small springs in the vicinity and scattered over the leeward parts of the island, but just below the drinking spring of the bath house, a spring (the most considerable of that nature in the island), issuing from the side of the hill, forms a large pool and runs in a continuous stream called the bath stream, deepening and widening as it flows till it expands into a large pond on the sea-shore about 500 yards from its source.

This spring is not enclosed nor covered and is used by those who cannot pay the fee of 6d. charged at the bath house, and also serves as a washing place. Although the spring is extremely hot, the stream varies in heat and in some places is cold. The baths have been of high repute, and the island was much resorted to by invalids when the hotel was properly kept. The extraordinary powers and unfailing efficacy of the Nevis baths have been long well known in the medical world, and have been celebrated in every treatise descriptive of the colonies. Mr. Osborne in his *Guide to the Madeiras, West Indies, etc.*, says: 'Nevis is celebrated for its mineral springs. The principal hotel is the Bath House which is situated on a rising ground and commands a view of the town, the adjacent country, and the sea. It may be considered as one of the most salubrious localities in the island. The house is distant from the landing place about $\frac{1}{4}$ mile. Appertaining to this establishment are hot and tepid baths possessing most valuable medicinal properties. Sir Hans Sloane says he mastered a severe cough by bathing in, and drinking, the waters during a few days' stay on the island. At one part of the stream which supplies the baths there are two springs, one so intensely cold as to produce a chill through the whole frame, and the other too hot to be borne by the naked foot. "An invalid," writes Mr. Coleridge, "with a good servant may take up his quarters here with more comfort than any other house of public reception in the West Indies."'

It will be seen from these extracts that the baths have always been the great institution of the colony; hence the device on the great seal. I have been informed by the Hon. George Webb, F.R.A.S., Treasurer, etc., an old inhabitant and a gentleman who for many years was Chief

Justice, and who three times administered the Government, and by the Hon. John A. Iles, Colonial Secretary, also an old public officer, that the great seal of the colony was made between thirty and forty years ago after a design by Mr. Colquhoun, the agent for the island in England, who submitted this device for the approval of the Government, intimating that it was meant to represent the healing virtues of its celebrated baths.

COMPOSITION OF COWS' MILK IN JAMAICA.

The following extract from the annual report of the Government Analytical and Agricultural Chemist in Jamaica is of interest. Dr. Cousins gives the result of analyses of milk from a large number of cows and refers to the proposal to establish a legal standard for the island:—

To obtain data as to the composition of cow's milk in Jamaica the Assistant Chemist has personally sampled and analysed the milk of ninety-two cows from seven dairies in Kingston and St. Andrew with the following results:—

MILK ANALYSIS.

	Total Solids.	Fat.	Solids not Fat.	Specific Gravity.
1 Average milk from 7 Kingston dairies ...	13.39	4.7	8.73	1.028
2 Average of milk from 92 individual cows in above dairies ...	13.83	5.1	8.69	1.028
3 Mean of 200,000 English analyses by H. D. Richmond ...	12.9	3.9	9.0	1.033

LEGAL STANDARDS FOR MILK.

Constituents.	United Kingdom.	United States.	Proposed for Jamaica.
Fat ...	3.0	3.25	3.5
Solids not Fat ...	8.5	8.5	8.25

The milk of the Jamaica cow compares favourably with that of imported animals. The fat of milk is naturally higher here than in the temperate climates, provided the cows are in good health. The effect of the imported Holstein cross is that of a serious reduction in the nitrogenous and mineral constituents of the milk. Careful selection of the local cows and the introduction of dairy shorthorn bulls should give us an excellent breed of milch cows for local purposes.

Adulteration of Milk. According to Professor Harrison's report on the working of the Food and Drugs Ordinance in British Guiana, there has been a steady increase in the proportion of the samples of milk purchased in Georgetown, which, upon analysis, have been returned as adulterated. This increase has been from 15.7 per cent. in 1902 to 59 per cent. during the half-year under report. This is a most unsatisfactory condition with regard to the milk supply of the city, the proportion being higher than has been recorded for many years back.

EDUCATIONAL.

Agricultural Education in Jamaica.

From the following extracts from the recently issued report on the Education Department of Jamaica for 1903-4 it will be seen that progress is certainly being made in the attempts to introduce the teaching of agriculture in the elementary schools of the colony.

In regard to the practical teaching in agriculture and horticulture Mr. Capper says:—

There is a continued increase in the number of attempts at practical field work, and the work shown is, in my estimation, exceedingly creditable. The advance is not to be measured by the amount of grants given, as the standard was at first for obvious reasons a very low one and has had of necessity to be raised. The following are the total amounts of grants for the past four years:—1900-1, £34 12s.; 1901-2, £47 12s.; 1902-3, £77 12s.; 1903-4, £105 12s. 1d.

The fourth course of lectures on agriculture was held in January 1904 at the Mico College by Mr. T. F. Teversham. Sixty teachers were present, and afternoon addresses and lectures were delivered, as on former occasions, by the Archbishop and others, whilst a course of evening lessons in manual occupation was again conducted by Mr. Peet and Mr. Skyers. The benefit of these courses is being increasingly felt.

The following are extracts from the remarks of the Inspectors on the subject of elementary science:—

‘About one-third of the teachers in my district have had the advantage of the special course at Hope of instruction in agricultural science, but I have not, since the beginning of this year, when the last course was given, inspected the schools of those who took that course. So far as my inspections have tested the matter, there have been in those schools whose teachers have taken such a special course, an increased interest manifested by the scholars and an increased value in the lessons in agricultural science given in those schools. The wisdom of giving this special course to our teachers is manifest. While only two teachers in my district have presented their practical work in the field as entitled to the special grant, several had little garden plots, some of which had been made very useful in illustrating agricultural teaching and some of them are to be enlarged and made more perfect, so as to merit the special grant this current year.’

‘This subject is, in many of the schools, intelligently taught, and the scholars give practical evidence of their interest in the lessons, which are mainly devoted to the principles of agriculture. The lessons are very frequently illustrated by diagrams, black-board drawings, and clay models.’

‘Some acquaintance, probably a slightly increased acquaintance, with some of the elementary principles of agriculture, is usually shown by some scholars. That is the most favourable statement that can with safety be made. So far as one can judge at inspection, not much is done in most schools by way of teaching this subject experimentally, and the tendency is to emphasize the rules rather than the reasons. The question “why?” should be a favourite question. Several teachers have, with varying degrees of success and failure, made at least some use of box

cultivation, etc., to illustrate certain facts to which they wished to draw the attention of the children, and there are some school gardens, a few of which are well kept; but it is a very rare thing to find a genuine attempt to teach by way of contrast, by setting the right way and the wrong side by side for the scholars to see.’

‘The number of small gardens is increasing rapidly and now that the size required for a grant under Article 112 is to be only 1 square chain, there will probably be a larger number of applications, but unless there is greater evidence of scientific methods and experimental work than the majority show at present, there will not be any great increase in grants under this article.’

‘Most of the school gardens in the eastern district were ruined in the hurricane, but the teachers have, as a rule, done all that can be expected to repair the damage. Only one of the schools I have visited has claimed the grant under Article 112: in this case very good work has been done.’



WEST INDIAN FISHERIES.

Bermuda.

The following note in regard to the fisheries in Bermuda is extracted from the *Annual Report* for 1904:—

I have in previous reports stated that there would appear to be a good opening for such an industry in these islands if worked on organized principles. Not only is no fish exported, but there is no regular fish market in the colony. Fish is purchased by butchers, by weight, and an incentive is thereby given to fishermen to catch the heaviest and coarsest kind of fish, and the ordinary households are forced to eat that or none. The only alternative is to keep one's own fish-pot or to subsidize a fisherman.

Tarpon Fishing in Jamaica.

The *Fishing Gazette* of May 13 has an interesting letter from Major Hutton, R.E., on ‘Tarpon Fishing in Jamaica.’ Major Hutton gives an account of some of his experiences with the tarpon—or trapon, as it is called locally—and a number of other game fish, including jack, snook, barracouta, bony fish, and others.

The Editor of the *Fishing Gazette* writes:—

Major Hutton, R.E., called on me the other day to say that statements to the effect that the fishing in Jamaica was very poor were the reverse of correct, and gave me some accounts of excellent sport which he had had with small tarpon on the fly, and larger fish on bait. He says he would not recommend any one to go there for sport as the want of [convenient?] hotels makes it necessary to know some planter in most cases. The fact is, hardly anything is known in Jamaica about the [tarpon] fishing.

MARKET REPORTS.

London,—June 6, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 2, 1905; and 'THE PUBLIC LEDGER,' June 3, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 13/- to 45/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
 BEES'-WAX—£7 5s. to £7 17s. 6d. per cwt.
 CACAO—Trinidad, 56/- to 62/- per cwt.; Grenada, 53/- to 54/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 38/- to 39/- per cwt.
 COTTON—West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—5/- to 7/- per bunch.
 ORANGES—10/- to 12/- per case.
 PINE-APPLES—Antigua, 14/- to 17/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, good to fine, 59/- to 67/6; low middling to middling, 44/- to 55/-; ordinary to good ordinary, 35/6 to 43/- per cwt.
 HONEY—17/- to 26/6 per cwt.
 ISINGLASS—West Indian lump, 2/3 to 2/8; cake, 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £14 10s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/5 to 1/6 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair to good pale, 1/3 to 1/5; red, 1/1 to 1/2; broken, 11d. per lb.
 NITRATE OF SODA—Agricultural, £11 5s. per ton.
 NUTMEGS—65's, 1/3; 76's, 11d.; 92's, 9d.; 126's, 5½d. per lb.
 PIMENTO—2¼d. per lb.
 RUM—Demerara, 1s. 3d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.
 SUGAR—Yellow crystals, 17/6 to 19/6 per cwt.; Muscovado, Barbados, 17/6 per cwt.; Molasses, 12/6 to 16/6 per cwt.
 SULPHATE OF AMMONIA—£12 15s. per ton.

Montreal,—May 9, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$21.00 to \$23.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 35c.; Antigua, 30c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 19c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5c. to 5¼c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey crystals, 96°, \$3.10 to \$3.35 per 100 lb.
 —Muscovados, 89°, \$2.43 to \$2.50 per 100 lb.
 —Molasses, 89°, \$2.00 to \$2.25 per 100 lb.
 —Barbados, 89°, \$2.10 to \$2.30 per 100 lb.

New York,—May 26, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 15c.; Grenada, 11¼c. to 11½c.; Trinidad, 12c. to 12½c. per lb.
 COCOA-NUTS—Jamaica, \$22.00 to \$23.00; Trinidad, \$20.00 to \$21.00 per M.
 COFFEE—Jamaicas, 8c. to 8¾c. per lb. (ex store).
 GINGER—Jamaica, 6c. to 8½c. per lb.
 GOAT SKINS—Jamaicas, 60½c. per lb.
 GRAPE FRUIT—Jamaicas, \$5.00 to \$7.00 per barrel.
 NUTMEGS—No quotations.
 ORANGES—\$2.50 per box.

PIMENTO—4½c. per lb.

PINE-APPLES—\$2.00 per crate.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3¼c. Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 14, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—25c. per gallon, package included.
 SUGAR—89°, \$2.00 per 100 lb.

Barbados,—June 17, 1905.—Messrs. T. S. GARRAWAY & Co.; and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.60 per 100 lb.

CACAO—\$12.00 to \$12.50 per 100 lb.

COCOA-NUTS—\$13.00 per M. for husked nuts.

COFFEE—\$10.00 to \$11.75 per 100 lb.

HAY—\$1.05 to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$55.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$65.00 per ton.

MOLASSES—20c. per gallon.

ONIONS—Madeira, \$2.25 per 100 lb.

POTATOS, ENGLISH—\$2.25 to 2 56 per 160 lb. (retail).

RICE—Ballam, \$4.45 per bag (190 lb.); Patna, \$3.10 per 100 lb.

SUGAR—Muscovados, 89°, \$1.90 per 100 lb.

British Guiana,—June 15, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 12c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 13¼c. to 14c. per lb. (retail).
 —Creole, 12c. per lb.

DHAL—\$3.30 to \$3.75 per bag of 168 lb.

EDDOES—\$1.00 to \$1.32 per barrel.

MOLASSES—Vacuum pan yellow, 16c. per gallon (casks included).

ONIONS—Tenerife, 3¼c. to 3½c. per lb.

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—12c. to 32c. per bunch.

POTATOS, ENGLISH—Bermuda, \$2.75 to \$3.00 per barrel (retail).

POTATOS, SWEET—Barbados, \$1.68 per bag; \$1.68 per barrel.

RICE—Ballam, \$4.20 to \$4.25 per 177 lb.; Creole, \$4.00 per bag.

TANNIAS—\$1.44 per barrel.

YAMS—White, \$2.00 per bag.

SUGAR—Dark crystals, \$3.00 to \$3.40; Yellow, \$3.50 to \$3.75; White, \$4.50 to \$4.75; Molasses, \$2.60 to \$2.80 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—June 15, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.50 to \$11.75; estates, \$11.90 to \$12.10 per fanega (110 lb.); Venezuelan, \$12.25 to \$12.60 per fanega.

COCOA-NUTS—No quotations.

COCOA-NUT OIL—67c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9½c. per lb.

COPRA—\$2.75 per 100 lb.

ONIONS—Stringed, \$3.50; loose, \$2.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.25 to \$1.40 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; white, \$4.75 to \$5.75 per bag.

SUGAR—White crystals, \$4.00; Yellow crystals, \$3.00; Molasses sugars, \$2.50 to \$3.00 per 100 lb.



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to take over the Central Cotton Factory and carry on operations on co-operative lines.

The Imperial Commissioner of Agriculture placed the facts at some length before the meeting. He recapitulated the history of the establishment of the cotton industry in Barbados and pointed out that the quality of the cotton, the yield, and the returns, which were being derived from its cultivation, were sufficiently promising to justify the planters in carrying on the industry. In fact, the cotton industry at Barbados might now be regarded as established on most promising lines. As a consequence they had arrived at a stage when it was desirable for the cotton growers to take into consideration whether they could not adopt action with the view of taking over the central cotton factory and working it in the interest of the cotton growers of the island.

The factory, so far, had been worked by a committee appointed by the Agricultural Society in co-operation with the Imperial Department of Agriculture. It was first opened in July 1903, when only one gin was available. Six months later the number had increased to six. A baling press was next added, and soon after, a Christy & Norris disintegrator, for reducing the cotton seed to meal. At the present time, the factory was as fully equipped as any Sea Island cotton factory in any part of the world.

Formation of a Cotton Growers' Company at Barbados.

ALARGELY attended meeting of cotton growers was held at Barbados on Friday, July 7, for the purpose of considering the advisability of forming a limited liability company

The Cotton Committee had worked the factory for nearly three years with the Imperial Department of Agriculture, and it had been shown that the factory was capable of doing excellent work, and that cotton

could be ginned and baled at a cost not exceeding 2c. (1d.) per lb. It was felt that it would be for the good, not only of the industry generally, but also of the cotton growers, if the factory were taken over and run on co-operative lines. The growers would thus obtain not only the profits arising from the cultivation of the cotton but also the profits of the working of the factory.

The total cost of erecting the factory and bringing it into its present efficient condition was £1,159 12s. 6d.; of this amount the Government of Barbados had contributed £649 9s. 6d., and the British Cotton-growing Association, in gins, baling press, and disintegrator, £246 6s. 10d. and a free grant of £100. A further sum of £166 16s. 2d. had been provided from the income of the factory.

Sir Daniel Morris mentioned that the Governor-in-Executive Committee would be prepared, in the event of a company of cotton growers being formed, to recommend to the Legislature that the interest of the Government in the factory might be transferred to the company for first-mortgage debenture bonds of the value of £600, bearing interest at the rate of 3 per cent. per annum, and also that a lease might be granted of the present site to the company at a nominal rent, provided the land was not required for public purposes. Under similar circumstances the British Cotton-growing Association was willing to accept £150 for its interest in the machinery. They therefore required about £600 to meet the payment of £150 and to carry on operations during the coming season.

The agreement of sale would include an undertaking that the factory would not charge more than 2c. (1d.) per lb. for ginning and baling cotton for cotton growers in Barbados; also that the factory would buy cotton from small growers or make advances to them to the extent of 75 per cent. of the value of their cotton. Further, in the event of a new law being passed to prevent cotton stealing, the company would become the principal buyers of cotton, in order to prevent its purchase by unauthorized persons.

On the motion of Dr. C. E. Gooding, M.C.P., seconded by Mr. H. E. Pilgrim, the following resolution was unanimously passed:—

‘That the cotton growers present at this meeting hereby agree to form themselves into a limited liability company in order to take over the Central Cotton Factory and work it on co-operative lines on the terms set forth in

the letters laid before them from the Colonial Secretary and the Secretary of the British Cotton-growing Association.’

Resolutions were also passed authorizing Sir Daniel Morris to communicate to the Governor-in-Executive Committee and the British Cotton-growing Association the decision contained in the above resolution.

Upon the suggestion of Sir Daniel Morris the following were appointed a provisional board of directors, viz., the Hon. F. J. Clarke, Dr. C. E. Gooding, Mr. Samuel Browne, Mr. T. B. Evelyn, jnr., Mr. G. Sebert Evelyn, Mr. H. E. Pilgrim, Mr. W. D. Shepherd, and Mr. J. R. Bovell, with power to take all necessary steps to start the company.

In answer to a cotton grower, Mr. J. R. Bovell said that the number of shares already taken was 1,216, equal to £608.

Very hearty and sincere votes of thanks were then accorded both Sir Daniel Morris and Mr. Bovell for their substantial services in connexion with the cotton industry and especially with the establishment of the factory, the control of which it was hoped would soon be in the hands of the cotton growers working on co-operative lines.



SUGAR INDUSTRY.

Seedling Canes in Jamaica.

In his report on the Sugar Experiment Station in Jamaica for the year 1904-5, Dr. Cousins makes the following references to the work in connexion with seedling canes:—

Experiments to test ten selected varieties of canes in 100-hole plots have been established at eleven estates in five parishes.

Selected seedling canes, from which trials on an estate scale are to be started in the coming season, have been supplied to twenty-two estates; for this purpose 35,500 cane tops and cuttings have been distributed from the Hope canes under my direction, of which it is estimated that 28,000 are actually growing.

Seven acres of land at Hope are reserved for the purposes of this scheme as a nursery for cane varieties. The reservoir was made available for irrigating the canes by the construction of a conduit, so that while the reservoir could store water all night, it could be drawn upon at the same time as the ordinary supply in the day time. The canes have made good growth; a breadth of Barbados seedling, No. 208, yielded 76.9 tons of cane per acre. Some 100 selected seedlings, besides thirty-five selected seedlings raised in Jamaica in 1903, will be ready for first selection in June next.

Danish West Indies.

The *Louisiana Planter* of June 24 contains the following note on progress in sugar manufacture in the Danish West Indies:—

The Breitsfeld-Danek Engineering Co., of Prague, Austria-Bohemia, have undertaken the construction of a new central sugar factory on the Lower Bethlehem estate in the Danish island of Santa Cruz, or Saint Croix. This factory is being built for a capacity of 500 to 600 tons of sugar-cane per twenty-four hours and is now nearly completed. The whole building is very neat, tasteful and of simple construction in iron and steel. The structural metal and the sugar machinery have all been supplied by the Breitsfeld-Danek Co., and their promptness in the construction of the buildings and in the erection of the machinery and the excellence of the work done make a record for such sugar factories as these in the West Indies. In this present case, within four months from the time the contract was taken all parts of the iron building and every machine were made and delivered.

It is encouraging to those interested in the cane sugar industry to see this spirit of progress and improvement manifested more generally in the West Indies, and it is quite a point for the little island of St. Croix to become one of the leaders in that improvement in cane sugar manufacture, which has become an absolute essential everywhere where sugar is made from cane, if cane sugar is to hold its own in the sugar-making world and regain the controlling position that it had a generation ago.

TRINIDAD AT THE COLONIAL EXHIBITION.

The following is a summary of an article by Mr. W. G. Freeman in the *West India Committee Circular* on the Trinidad exhibit at the Colonial and Indian Exhibition:—

The importance of the cacao industry to Trinidad is brought home to the visitor by the wealth of material by which it is illustrated at the Crystal Palace Colonial Exhibition. There are flowers and pods, excellently preserved in formalin, and some of the latter are cut open, displaying the seeds, so that it is possible at a glance to note the distinguishing features of Criollo, Forastero, and Calabacillo varieties. The commercial staple is well illustrated by some sixty to seventy large samples of cacao beans. The samples, lent by Mr. J. Hoadley, illustrative of the results obtained from his new cacao drier, will be of considerable value to all practically interested in this product. Those unfamiliar with the mode of cultivation and manufacture of cacao, will certainly be able to learn much if they carefully look over the photographs with which the exhibit is so plentifully furnished.

Sugar with its by-products is well represented. There are abundant fresh canes, etc., and the chief grades of sugar produced in the colony are shown, including white, yellow and grey crystals and molasses sugar, and also molasses and rum. 'Molascuit' affords an instance of the practical utilization of a previous waste product.

The export of cocoa-nuts from Trinidad is an industry of considerable standing, and some 10,000,000 nuts are annually sent out of the colony. The preparation of copra, which is so important an industry in the East, has only recently been extensively taken up in the West Indies. The specimens in the court show that copra, of apparently good quality, can be prepared in Trinidad, and it is gratifying to note that during the last two years the exports have increased nearly

three-fold. Cocoa-nut oil, of which such large quantities are produced for local consumption, and to a less degree for export, is also represented, together with the cocoa-nut meal made from the cake left after the expression of the oil. If this meal is available in sufficient quantity there should be a market for it in the West India Islands, where relatively enormous quantities of oil cake and other cattle foods are imported annually. Manufactured products of cocoa-nut oil are represented by a number of kinds of soap of good appearance, and cocoa-nut pomade.

Considerable attention has been paid to essential oils by the Botanic Department of Trinidad, and the possibilities of the island in this direction are sufficiently indicated by a set of some fourteen specimens. Samples are also exhibited of camphor, distilled from *Cinnamomum Camphora*, introduced by the Botanic Department from the East. Citronella oil is noticed in the hand-book as an industry which could be developed at short notice should favourable conditions arise in the world's market.

That it is possible to grow cotton of good quality in Trinidad is demonstrated by a bale of Sea Island cotton and the samples of other varieties exhibited. Leaf tobacco, cigars, and cigarettes indicate the potentialities of the colony in respect to the fragrant weed.

The exhibit of rice affords proof of the suitability of local conditions to the cultivation of this product. It is an industry which might well be extended, especially considering that during the last three years, to go no further back, some 20,000,000 lb. of rice have had to be imported annually into the colony to supply local demands.

Trinidad is very rich in timber, and the specimens of woods exhibited give some idea of the resources of the colony in this product. The chief exhibits in the animal products group are the sounds of a fish which are exported as West Indian isinglass. Honey of very good appearance is shown, and previous samples have been valued at a good figure in London. Samples of crude and refined asphalt, manjak or glance pitch and petroleum are also shown.

Detailed information is available from the various hand-books, guides, etc., which may be seen in the court, and the comprehensive summary of the exports and imports of Trinidad, specially prepared by Professor Carmody for this Exhibition. Mr. J. H. Hart, the Superintendent of the Botanic Department, is almost constantly in attendance, and places his knowledge of Trinidad and Trinidad products freely at any one's disposal. Every one concerned, both in Trinidad and in England, must be congratulated on having brought together, in such good condition, a collection so representative of the products and resources of Trinidad.

WEST INDIES AND CANADA.

Steamship Communication.

Mr. J. Russell Murray writes to the Imperial Commissioner of Agriculture under date June 10, 1905, as follows:—

A contract is being made with the Elder, Dempster & Co. for a service from Montreal in the summer, and from Nova Scotia in the winter, to Nassau, Cuba, and Mexico; the first steamer, the S.S. 'Yoruba,' has already a full cargo engaged. The Pickford & Black line will be continued as at present for another year when the question will be re-opened and the service probably reorganized. The opinion continues to be strongly held here that Montreal should be the terminal port during open navigation.



WEST INDIAN FRUIT.

CULTIVATION OF ORANGES IN DOMINICA.

In the *Agricultural News* (Vol. III, p. 340) there was published a brief description by Dr. Watts of the system of cultivation for oranges adopted by Mr. Scully at 'Corona,' Dominica. In a report on a recent visit to the island Dr. Watts again refers to the success that has attended this system:—

Attention may again be drawn to the rational manner in which Mr. Scully is cultivating his orange plantation at Corona. A circular space is kept cleanly weeded around each orange tree, and in weeding care is taken to prevent the soil from being dragged away from the roots of the trees; the intervening ground between the weeded circles remains covered with grass and the weeds natural to the district; these are periodically (three or four times a year) cut down by means of cutlasses and allowed to lie on the surface as mulch. So far, no turf has formed, and the soil remains in excellent condition, perfectly protected from wash, and with its supply of humus constantly renewed. The existence of this cultivation constitutes an object-lesson of great value to other planters who are sure to be favourably influenced by it.

BARBADOS BANANA INDUSTRY.

The following is an extract from a letter to the local newspapers from Mr. J. R. Bovell, Agricultural Superintendent at Barbados, dated July 3, in reference to the shipment of bananas:—

I have received a telegram to-day from Messrs. W. Pink & Sons informing me that the bananas shipped by the S.S. 'Trent' on June 3 last have netted 2s. 11½d. per bunch.

With regard to those shipped by the S.S. 'Orinoco' on June 17 last, I regret to say that they inform me that 10 per cent. have arrived bad, and the bunches were mature and ripe. They also advise us to ship as many bunches as we can.

In connexion with this matter I will also ask you to allow me to remind banana growers that the S.S. 'Tagus,' in which the Hall's system of cold storage is installed, is the next steamer for England, and that they should ship as many bananas by this ship as possible, which usually carries them in good condition. On her last voyage she carried 1,538 bunches, out of which only one arrived bad.

It may also be of interest if I mention that, in a letter dated June 16, Messrs. W. Pink & Sons write: 'The demand for bananas is now enormous, we can sell any quantity that

can be shipped. It is generally known that these bananas will increase in favour, and they will without doubt hold a primary position in the markets here.'

KOLA IN SAMOA.

The following note on the cultivation of kola, extracted from the *Consular Report* on the trade of Samoa for 1904, contains items of interest:—

Kola does exceedingly well up to an altitude of 500 feet above the sea. Communication from any firm with regard to tropical industries will receive full attention at the consulate. Kola trees here give their first crop in seven years from date of planting.

This article, grown principally on the West Coast of Africa, where it is largely consumed, is now, in a limited way, coming into use in Australia as an addition to or substitute for alcoholic drinks, the craving for which it is said to keep in check. It is a great thirst quencher and removes bodily fatigue.

As some difficulties attend its transport, for the fresh bean appears soon to lose its colour and presumably some of its strength when long exposed to the air; it is possible that it may become an export to Australia, which lies so close to Samoa that it can be shipped there in six or seven days.

Sierra Leone alone supplies the interior of Africa with kola beans to the value of £37,000 yearly.

Each pod contains from four to six beans. On the Gold Coast the beans are sold for 1s. 6d. to 2s. 3d. per 100. On the Gold Coast the yield of trees seven years old is stated to be 3,500 beans per tree, worth there £2 10s.

GOATS FOR SALE.

The following goats of improved breed are offered for sale:—

Three pure-bred, Toffenberg male kids, four months old (by Bruce out of Pauline). Price, 6 dollars (£1 5s.) each—not including crate and freight.

Two half-bred, Toffenberg ewes, eight weeks old (by Bruce out of good native goat). Price, 3 dollars (12s. 6d.) each—not including crate and freight.

A fine cross-bred male goat (by Black Rock out of good native goat). Cream coloured, eighteen months old, in good condition. Price, 12 dollars (£2 10s.), not including crate and freight.

Address:—Stockmaster,
Imperial Department of Agriculture,
Head Office: Barbados.



THE TARPON.

In the first volume of the *Agricultural News* several interesting notes were published with regard to the occurrence of tarpon in the West Indies. The extract in the last issue (p. 207) indicates that excellent sport is to be had with this fish in Jamaica.

An interesting account of the tarpon has been recently published in the 'Smithsonian Miscellaneous Collections' (Vol. 48, part I) by Theodore Gill. The paper is entitled 'The Tarpon and Lady-fish and their Relatives.' The following extracts from Mr. Gill's paper are likely to be of interest:—

The tarpon (*Megalops atlanticus*) has an elongated, fusiform shape; the forehead slightly incurved (rather than straight) to the snout; the chin projects and is obliquely truncated; the dorsal fin (with twelve rays) is on the posterior half of the body, nearly midway between the ventrals and anal; its free margin is very sloping and incurved, and its long hind ray reaches nearly to the vertical of the anal; the anal (with twenty rays) is about twice as long as the dorsal and falciform; the caudal fin has a very wide, V-shaped emargination. The scales are in about forty-two oblique rows. It reaches a length of about 6 feet, sometimes more.

The tarpon may be briefly defined as a littoral fish of warm American seas often entering into rivers and acclimated in some inland lakes.

Florida and Texas are the states in whose waters the fish is most frequently seen, because there most looked for, but its range extends far beyond those coasts in all directions. In summer wanderers visit the north as far as Massachusetts, where large individuals of the 'big-scale fish,' as they are there called, are 'taken every year in traps at South Dartmouth in the latter part of September;' southward they may be found in Brazil and sporadically in Argentina. Around all the islands of, and in, the Carribean Sea, and Gulf of Mexico, schools may be met with. Further immigrants have found their way into rivers that enter into the tropical seas and the Lake of Nicaragua has long been famous as the home of the species.

Being essentially a warm-water fish, it is only in the warm months that the tarpon is to be found at its northern and southern limits. On the approach of cold weather it retires towards the tropics. The tarpon is sensitive to sudden changes of temperature and especially to cold, and to such changes it is sometimes subject in its northern range.

The life-history is very imperfectly known, but it does not appear to breed at any place along the continental coast of the United States, for none except large individuals have been recorded from those places most resorted to by anglers.

It apparently demands a temperature and conditions which the reef-forming coral animals require, and sheltered brackish or fresh water for oviposition. In such localities about Porto Rico, in February 1899, Evermann and Marsh found, not eggs, but very young, and there 'it evidently breeds.'

Most of the large tarpons caught along the coasts of

Florida and the Southern States have attained full maturity; of such the length is about 6 feet, and the weight approximates 100 lb.; they are probably nearly or over three years old. Growth, however, is continued in some much beyond the average, one of 383 lb., it is claimed, having been harpooned.

The tarpon is now considered to have little or no edible value. It has, indeed, been declared by Schomburgk to be 'considered a delicate eating' in Barbados, and in the United States been experimented with occasionally; one (W. H. Burrall), who did so in 1874, declared that it was very palatable, but his taste was exceptional. It has been frequently tried since but rejected for the table. An effort was made on one or two occasions in Massachusetts when considerable numbers had been caught, 'to find a market for them,' as at New Bedford, 'but the people did not like them, owing to the toughness of the flesh.'

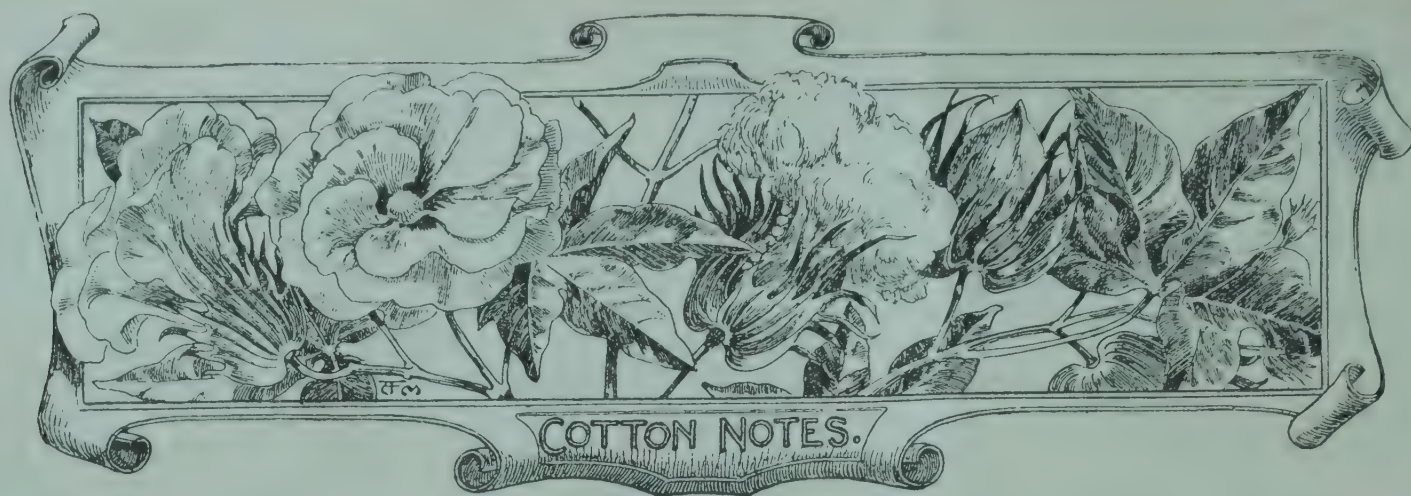
DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture will proceed to Jamaica by the mail steamer leaving Barbados on the 31st. instant. During his stay in the colony, Sir Daniel Morris will devote attention to the cotton industry, the new sugar-cane experiments carried on by Dr. Cousins, and other matters brought under his notice by the Government. Arrangements will also be made for the West Indian Agricultural Conference proposed to be held in Jamaica in January next.

Mr. L. Lewton-Brain, B.A., F.L.S., who for the last three years has been engaged as Mycologist and Lecturer in Agricultural Science on the staff of the Imperial Department of Agriculture for the West Indies, embarked for New York on July 8 to take up the appointment of Assistant Director of the Pathological Division at the Laboratories of the Hawaiian Sugar Planters' Association. Mr. Lewton-Brain has rendered excellent service by his researches in connexion with the sugar-cane, cacao, and other industries. His colleagues part with him with great regret and they wish him every success in his new duties on the other side of the world.

On the recommendation of the Director of the Royal Gardens, Kew, the Secretary of State for the Colonies has approved of the appointment of Mr. F. A. Stockdale, B.A., First-class Natural Science Honours, Magdalene College, Cambridge, to be Mycologist and Lecturer in Agricultural Science on the staff of the Imperial Department of Agriculture for the West Indies. Mr. Stockdale, who is to succeed Mr. L. Lewton-Brain, B.A., F.L.S., will shortly arrive in the West Indies.

On the recommendation of the Imperial Commissioner of Agriculture for the West Indies, Mr. W. N. Cunningham, Assistant Superintendent of the Hope Gardens at Jamaica, has been appointed Curator of the Botanic and Experiment Station at Nassau, Bahamas. Mr. Cunningham will carry on his duties under the new Board of Agriculture established in that colony.



SEA ISLANDS MARKET REPORT.

Recent reports of Messrs. Henry W. Frost & Co., have the following notes on the Sea Islands crop:—

We have had more seasonable weather during the past week, admitting of plantation work being resumed after the long rainy spell; consequently, conditions are more promising, and we hope we shall be having better advices from now on. The acreage planted is fully equal to last in Carolina and Florida; and the impression is that there has been some increase in Georgia. (June 3, 1905.)

The weather during the week has been very favourable, admitting of plantation work being generally resumed, and the advices generally report the condition improved. The fields have now been worked, good stands have been obtained and the crop is in better condition than at this time last year. (June 10, 1905.)

As the weather has been favourable for the past week the reports from all sections are good. The crops are now free of grass, good stands have been secured, and the outlook is promising at present. (June 17, 1905.)

WEST INDIES.

At a meeting of the second International Cotton Congress held in Manchester on June 9, Mr. J. Arthur Hutton, Vice-Chairman of the British Cotton-growing Association, read an interesting paper regarding the operations of the Association. The following is extracted from a report of the meeting in the *West India Committee Circular*:—

Mr. Hutton went on to say that it was in the West Indies that the efforts of the Association had been most successful, and this was principally due to the fact that the plantations were in the hands of Europeans, and that the Association met with most hearty co-operation from the Imperial Department of Agriculture, which took up the cause of cotton growing with the greatest zeal. In no other part of the Empire had the Association's work advanced so rapidly, or so nearly approached a commercial basis. Fortunately, it had been proved beyond all possible doubt that the West India Islands could grow Sea Island cotton of the best possible quality, and that the planter could make money out of it. If it came to a question of competition, the conditions were so much more favourable in the West Indies that the planters there could produce Sea Island cotton more economically than could be done in the United States. Cotton from the West Indies was arriving now by every steamer, and the bulk of it was selling at 16d. to 18d. per lb., and the quality was very much improved and considerably better than the average quality of American Sea Island cotton.

EXPORTS FROM THE WEST INDIES.

On p. 151 of this volume of the *Agricultural News* a statement was published (furnished by the Customs Department in each case) showing the amount and estimated value of cotton exported from the various West Indian Colonies during the quarter ended March 31, 1905. Since that statement was published returns have come to hand from Jamaica showing that 3,918 lb. of cotton (variety unknown), of the estimated value of £154, were exported during the quarter. This makes the total weight of cotton exported from the British West Indian Colonies, during the quarter, 418,166 lb., of the estimated value of £19,608.

ST. VINCENT.

At a meeting of the St. Vincent Cotton Growers' Association on June 28, Mr. W. N. Sands, Agricultural Superintendent, read a paper reviewing the position of the cotton industry in St. Vincent with suggestions for the present planting season.

The following is a short summary of Mr. Sands' paper:—

In May 1904, and in one or two cases a month or so earlier, planting was commenced on a much larger scale than the previous season, but only Sea Island cotton seed was put in. Before being distributed it was thoroughly disinfected at the cotton factory to prevent the introduction of any cotton diseases not already existing in the land. The seed was sown at intervals from May until October, but the chief areas were planted from June until August. The total area planted was 1,471 acres. In some unfavourable localities and exposed situations, the growth was poor, or the bolls failed to mature. It was observed that poor returns were obtained from cotton sown earlier than May or later than August. On the whole, however, the season of 1904 might be considered a favourable one for the plants, the rainfall being well distributed.

The cotton factory was open from the first week in January till June 15. The total amount of seed-cotton received at the factory was 281,606 lb., which when ginned gave 77,814 lb. of lint and 199,941 lb. of seed. The proportion of lint to seed-cotton by weight was therefore 27.63 per cent. The lint was made up into 233 bales, each containing on an average 333 lb. net.

The prices obtained have been in every way satisfactory, and for the first-quality cotton an all-round price of 1s. 5d. per lb. has been obtained. I have not yet heard the price realized for cotton of other grades. The reports received from the brokers and others have been very gratifying.

and to-day St. Vincent cotton holds the proud position of being the finest produced in the British Empire. Owing to St. Vincent cotton being so exceptionally good, we have found a market for the seed obtained from our best marks, and at the present time I am busy preparing and packing selected and disinfected seed for planting purposes in other West India Islands. It may be of interest to add that to date 10,215 lb. of treated seed have been exported and 9,282 lb. treated and returned to the growers here.

Having to plant seed of our own growing, there is a point to which I would call your attention, that is, the desirability of changing your seed. It is a practice, as you are aware, in other countries to change the seed of staple and other crops from time to time, and planters know that they obtain much better results by adopting it. I would therefore suggest, where not already done, that it would be desirable to sow seed from other districts rather than sow seed grown on the estate, that is, of course, if seed of apparently the same quality can be obtained by exchange. Then it is important, in order to obtain the best results, that all seed planted should have been selected and disinfected beforehand. The members of this Association have recognized the importance of this work, and as far as I can ascertain, all the seed to be planted this season will have been treated at the cotton factory.

With regard to the selection of suitable land, there are several points to be considered. Badly drained land must be avoided, also land much exposed to the wind, or subject to very heavy rainfall. Next, the land must be well cultivated and manured. Manuring is particularly necessary in the case of lands lately cultivated in arrowroot, or exhausted by other crops.

The best months for planting in St. Vincent are undoubtedly June, July, and August.

Two very serious diseases affected cotton plants last season, viz., anthracnose of the bolls and the leaf-blister mite. I have observed that the recommendations of the Department to pull up and burn the old stalks before the fresh seed was sown have been carried out. Perhaps the most effectual means of keeping these pests in check will be the sowing of selected and disinfected seed, planting at the right time, selection of suitable land, and good cultivation and manuring.

PLANTING LIME TREES.

In forwarding proposals with regard to a lime experiment station in Dominica, Dr. Francis Watts makes the following observations in regard to laying out a lime plantation:—

In planting lime trees it is usually the custom to set them out at the distances the trees are to be when they have arrived at maturity. This usually involves two evils: first, that in the early stages the trees are placed at relatively great distances apart, and, secondly, that as they reach maturity they are often too close. It is desirable that lime trees should stand at such distances from each other that the branches of adjacent trees do not touch, for the fruit is largely borne on the ends of the branches. In cases where the trees are growing in contact, it will be seen that there is merely a leafy canopy overhead and that the lower branches are bare of leaves and destitute of fruit: in this respect a lime is in striking contrast to a cacao tree. A well-grown lime tree is practically hemispherical in shape and bears fruit all over its periphery from the top of the tree down to the ground. When lime trees grow in close contact, so as to reduce the bearing area to the overhead canopy,

there may be a considerable quantity of dead wood formed on account of the efforts made by the trees to effect something in the way of self-pruning. This dead wood is objectionable as it may serve as the starting point for various diseases.

In order to avoid these objections, I may suggest the desirability of planting the trees at close distances at first so as to cover the ground well, thus ensuring a large return of fruit at an early date, and then, as the trees begin to touch each other, to cut back certain trees, marked from the first as temporary, so as to afford sufficient space for the proper development of the permanent trees. The cutting back should be gradual, a little being done rigorously every year or at stated times as required; the trees in process of destruction from cutting back should yield good crops up to the time they are completely eradicated. In this way a lime plantation should be soon brought into full bearing and maintained in that condition for a number of years.

That this method may be successful, it is essential that the trees which are to be cut back should be known and marked from the outset, and they should be ruthlessly cut back as occasion requires. The grave danger in this method is that one may plant closely and then neglect to cut back; under these circumstances much harm, instead of good, will result.

Two methods of cutting back suggest themselves: one in which the trees in alternate rows, counting the rows in each direction, are cut back, and the other in which alternate trees in alternate rows are cut.

The following diagram, in which P stands for permanent trees and t for those to be cut back, will make this clear:—

First method:—

```
t P t P t P t P t P t P t
t t t t t t t t t t t t t
t P t P t P t P t P t P t
t t t t t t t t t t t t t
t P t P t P t P t P t P t
```

Trees as planted, say 6 × 6 feet.

```
P P P P P P
P P P P P P
P P P P P P
```

After cutting back, trees 12 by 12 feet.

```
P P P
P P P
```

After further cutting back if necessary, trees 24 × 24 feet.

Second method:—

```
t P t P t P t P t P t
P t P t P t P t P t P
t P t P t P t P t P t
P t P t P t P t P t P
```

As planted, trees say 6 × 6 feet.

```
P P P P P P
P P P P P P P
P P P P P P P
P P P P P P
```

After cutting back, trees, 8½ by 12 feet.

```
P P P P P P
P P P P P P
```

After further cutting back, trees 12 × 12 feet.

The distance chosen for the original planting may vary, but distances of from 6 to 9 feet are suggested as convenient.

It will be noted that the first and second methods, at one stage, both result in trees standing at double the original distances. It is obvious that cutting back can be carried on stage by stage as long as it is considered prudent.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue deals with a meeting of cotton growers held in Barbados to consider the advisability of forming a limited liability company for the purpose of assuming the control of the Central Cotton Factory.

A summary of a descriptive article by Mr. W. G. Freeman on the Trinidad exhibit at the Colonial and Indian Exhibition will be found on p. 211.

Extracts from an interesting account of the habits of the tarpon are published on p. 213.

The 'Cotton Notes' in this issue contain a review of the position of the industry in St. Vincent. The outlook for cotton in that island would appear to be particularly bright (see pp. 214-5). On the latter page will also be found suggestions by Dr. Watts with regard to the planting of lime trees.

Brief entomological notes of interest will be found on p. 218. These deal with the 'red maggot' of cotton, which is a somewhat common pest in Barbados, and with the identification of some West Indian *Orthoptera*.

The account on p. 219 of successful experiments in the use of *Castilloa* as a shade tree in cacao plantations is likely to prove of interest to cacao planters in the West Indies, where it has been suggested that this practice might be adopted.

Brief reviews of recently issued departmental reports will be found on p. 221. On p. 222 are reports on the recent half-yearly examinations at the West Indian Agricultural Schools.

Tarpon in the West Indies.

Elsewhere in this issue an interesting account of the tarpon is reproduced. Readers of the *Agricultural News* will be well aware that this fish occurs throughout the West Indies, and notes on its occurrence in Jamaica, British Guiana, Trinidad, and other islands, were published in the first volume of this journal, where catches of some very large fish are recorded.

This is one of the best of game fishes in the tropics, and affords excellent sport which should prove attractive to winter visitors in these islands. It is also known as 'kuffum' or 'cuffum' in some of the islands. The tarpon is found in the sea, in creeks, in rivers, and in salt lagoons.

Toffenberg Goats at Barbados.

The Toffenberg goat 'Pauline,' the fine milking goat introduced by the Imperial Department of Agriculture in January 1903, has suddenly died at Halton estate, Barbados, from acute cholera. As noted in the *Agricultural News* (p. 172), 'Pauline' in March last gave birth to three male kids, and for some time after they were weaned, she gave on an average 7 pints of milk daily. Including the two kids that arrived with her in 1903, she had given birth to seven kids—six males and one female.

'Bruce' the handsome Toffenberg 'billy' that came out with 'Pauline,' is in splendid condition; as also a son of his 'Wallace' at Halton estate. Another son 'Paul' is at St. Vincent.

West Indian Botanic Stations.

The Annual Reports of the several Botanic Stations in the West Indies, for the year ended March 31 last, have been prepared and will be published with as little delay as possible. The report on the Experiment Station at Tortola, Virgin Islands, has already been issued and is briefly reviewed elsewhere in this number of the *Agricultural News*. It is expected that the report on the Botanic Station, Agricultural School, etc., at St. Vincent will be ready for distribution by next mail.

These reports record a large amount of valuable work in connexion, not only with the routine work of the gardens, but more especially with the growth and distribution of economic plants and the establishment of new industries. Thus, in several of the reports useful and practical information will be found in reference to the cultivation of cotton in the West Indies, in connexion with which the local officers of the Imperial Department of Agriculture have rendered signal service.

A feature to which greater prominence is being given in these reports is a record of the efforts to introduce the teaching of the principles of agriculture in the primary and secondary schools.

These reports, as soon as published, will be obtainable from all agents for the sale the Department's publications at the small cost of a few pence.

Rubber Trees in Dominica.

In the *Agricultural News* (Vol. IV, p. 39) a note from the Administrator of Dominica was published describing the system of road-side planting of rubber trees that had been adopted in Dominica. For a distance of 9 miles along one side of the Imperial road, plants (to the number of about 2,500) of the two species *Castilloa elastica* and *Funtumia elastica* have been planted alternately. As the altitude of the road varies from 450 feet to 1,800 feet, this experiment is likely to furnish very valuable information as to the conditions of elevation, soil, and exposure at which these trees thrive best.

In a recent report to the Imperial Commissioner of Agriculture, Dr. Francis Watts makes some interesting observations on this experiment. The best results have been obtained in the district of Bassinville, where the *Castilloa* trees have thriven remarkably well. In other districts the *Funtumia* trees appear to have grown better. Supplying will be necessary in some places, and for this purpose seeds will soon be available at the Botanic Station.

The experiment undoubtedly brings out the fact that *Castilloa* requires a well-drained soil, which must not be too heavy. As pointed out by Dr. Watts, it may usefully be assumed as a guide in planting *Castilloa* that this tree requires much the same soil conditions as cacao.

Insect and Fungoid Pests in British Guiana.

In the Annual Report on the British Guiana Botanic Gardens, reviewed elsewhere in this issue, Mr. Bartlett makes interesting observations on the injuries done to plants in the colony by insects and fungi.

Attention was paid to the alleged destruction of rice by the 'rice bug' in the island of Leguan. The damage was caused by the insects sucking the grains in their young stage. This was, however, restricted to one field and was found on investigation not to be as great as was stated.

Many of the cocoa-nut and cabbage palms, both in the gardens and in other parts of the colony, were attacked by caterpillars which fed on the leaves. In some cocoa-nut plantations considerable damage was done. 'Insufficient has been ascertained about the life-history of the insect to suggest means of destroying it.' Reference is also made to the larger moth borer of the sugar-cane (*Castnia licus*), a full account of which has already appeared in the *Agricultural News*.

In regard to fungoid diseases, Mr. Bartlett's observations are confined to the pests of cacao. As has already been reported, the 'witch broom' disease was discovered on one estate; the 'thread' disease on two estates; while on every estate visited the cacao pod disease, caused by *Phytophthora omnivora*, was found. The 'brown rot' disease, due to *Diplodia cacaoicola*, was found only on dead husks.

A previously undescribed fungoid disease was plentiful on some plantations. The cause of this has not yet been identified.

Manuring Forest Trees.

An article in the *Journal of the Board of Agriculture* (Great Britain) reviews experiments that have been carried out in Belgium, Germany, and Holland, to determine the advisability of cultivating and manuring the soil for forest trees.

Usually no special measures are taken to prepare the soil before transplanting forest trees from the nursery. The German Agricultural Society is directing a comprehensive series of trials for the purpose of ascertaining what form of manuring is likely to give the best results. As far as these have gone, they appear to indicate that a considerable increase of growth may be obtained by means of manures and cultivation.

'Careful management of the humus is a point which is considered deserving of special attention, as it is the only source of plant food in the later stages of the trees.'

Importance is also attached to the use of leguminous plants as an inexpensive means of enriching the soil: moreover, their cultivation offers the best means of deepening the soil.

Agricultural Industries of Bermuda.

It is stated in the *Annual Report* on Bermuda for 1904 that the cultivation of onions, potatoes, and lily bulbs for the United States markets is the chief agricultural industry of Bermuda. Special reference has been made to the onion trade. The potato crop was somewhat smaller than in 1903. The lily crop was again a small one, and the prices were poor. It appears that the Bermuda lily has now to compete with the Japan variety, which is placed on the American market at a low price. Diseases affecting the lily bulb are being investigated, and new varieties tested.

The exports of arrowroot show an increase. The one factory equipped with modern plant is capable of producing a large quantity of this valuable commodity, which is of excellent quality and commands a high price in the home and foreign markets. There was during 1904 an appreciable increase in the exports of vegetables other than onions and potatoes.

Reference is made in the report to the Public Garden which is supported chiefly as an Experiment Station under the management of the Board of Agriculture. Mr. T. J. Harris, formerly of the Department of Public Gardens and Plantations, Jamaica, assumed charge at the end of the financial year, and much good work was done at the garden.

It is evident that useful work is being carried on by Mr. Harris. Experiments are to be carried out in growing Sumatra tobacco for wrappers, in the cultivation of new varieties of potatoes, in establishing standard varieties of vegetables and strawberries for Bermuda, in the cultivation of peaches, etc. Some difficulty has been experienced in growing fruit on account of the attacks of the fruit fly. Mention was made in the last issue of the *Agricultural News* (Vol. IV, p. 200) of Mr. Harris' efforts to raise onion seed locally.



INSECT NOTES.

The Red Maggot of Cotton.

This insect first came to notice in a field of ratoon cotton in Barbados in November 1903, where it did considerable damage. Since that time it has been found in many parts of Barbados, and specimens have also been received from Montserrat. A brief account of the red maggot was given in the *West Indian Bulletin* (Vol. IV, p. 335), and it is mentioned in the *Agricultural News* (Vol. III, p. 426).

The red maggot is the larva of a small fly which lays its eggs in wounds or breaks in the bark of the cotton plant, although attacks have been noticed on stems of cotton where there have been no wounds in the bark, and it seems likely that the insects are able to get in through the uninjured bark. The maggots when first hatched are whitish and very small, but as they grow larger become reddish in colour. The entire larval life is spent between the bark and the wood, feeding in the cambium.

The adult fly is a very small, two-winged insect with long antennae and long slender legs. It belongs to the same group of insects as the pear midge, the wheat midge, and the Hessian fly, all of which are serious pests in other countries.

This is the first insect of its kind that has been recorded as attacking the cotton plant, and it has recently been named and described from specimens sent by the Imperial Commissioner of Agriculture to the Bureau of Entomology of the U. S. Department of Agriculture.

Mr. D. W. Coquillett, to whom the specimens were referred, reported that the insect was a species of *Diplosis*, but after further study of additional material, he described it in the *Canadian Entomologist* (Vol. XXXVII, p. 200) under the name *Porrichondyla gossypii*, new species.

West Indian Orthoptera.

In the *Entomological News* (Vol. XVI, No. 6, p. 173) Mr. James A. G. Rehn, of the Academy of Natural Sciences of Philadelphia, publishes some 'Notes on a small collection of *Orthoptera* from the Lesser Antilles, with the description of a new species of *Orphulella*.'

The collection from which these notes were made was sent to Mr. Rehn from the Imperial Department of Agriculture, and included specimens of the forms of *Orthoptera* (earwigs, cockroaches, mantids, mole-crickets, crickets, and grasshoppers) contained in the collection at Barbados.

These notes are of special value and interest, as they place on record the distribution of these insects and clear up some doubtful points in nomenclature. Thirteen species are not contained in the two papers of Brunner and Redtenbacher, which dealt with the extensive collections of Mr. H. H. Smith in St. Vincent and Grenada.

'With few exceptions the following records are the first from the islands represented, several South American forms being here recorded from the West Indies for the first time.

'Probably the most striking fact noticed in studying this collection is that regarding the distribution of the two species of *Orphulella* here treated. The widely distributed

O. punctata is represented by specimens from Dominica and St. Lucia, having also been recorded from Grenada, St. Vincent, and Trinidad, while in Barbados it is apparently replaced by a quite distinct species, which, judging from the amount of material examined, is as abundant as *O. punctata* is in the localities where found.'

The species of *Orphulella* are small, brownish grasshoppers. The new species has been named *Orphulella Ballou*, and the author says regarding the name: 'I take pleasure in dedicating this species to Mr. H. A. Ballou, Entomologist to the Imperial Department of Agriculture for the West Indies, through whose kindness I received the present collection for study.'

AGRICULTURAL PROSPECTS AT BARBADOS.

The Governor of Barbados (Sir Gilbert T. Carter, K.C.M.G.) in his speech delivered on the opening of the Legislature on Tuesday, July 4, made the following reference to the planting industries of the island:—

In view of the condition of the sugar industry in this island and, so far as can be foreseen, its discouraging future, I cannot help thinking that it would be wise to consider seriously the question of raising other products of a more profitable nature. I am aware that no lack of energy and enterprise has been shown by the indefatigable head of the Imperial Department of Agriculture and his capable staff in advancing this policy and putting it into practice, and it has been demonstrated that cotton of the best quality can be successfully grown not only in Barbados but in the adjacent islands. Excellent bananas have also been cultivated, which it has been found profitable to ship, and I have no doubt there are other products still waiting which would give more lucrative results than can be obtained from sugar. In this connexion I may mention the species of *Agave* which produces the fibre known as 'Sisal.' This, after many vicissitudes, owing to want of expert knowledge, is now successfully and profitably cultivated in the Bahamas; there is a large demand for this fibre in the United States, and it is admitted free of duty. I understand that a supposed experiment was made with this plant here, but owing to a mistake having been made in the species cultivated, it was a failure. The true species *Agave sisalana* is easy of culture, is not attacked by insect pests, and is unaffected by the climatic excesses either of drought or rain. The fibre can be separated by hand if desired, and machinery for extracting it is not of a very expensive character.

CRIOLLO CACAO IN JAMAICA.

The Jamaica *Gleaner* has the following note on a plantation of Criollo cacao in that island:—

On May 15, Mr. W. Cradwick, Travelling Instructor, and Mr. J. W. Hill, manager for Messrs. Rowntree and Co., in Jamaica, paid a visit to the cacao plantation at Copse estate in Hanover. Mr. Hill expressed himself as highly delighted with the cultivation there. The chief field consists of 15 acres of pure Criollo cacao trees one year old, planted 10 feet apart. Mr. Hill said they were equal to the best field of Forastero plants that he had ever seen either in St. Mary or Portland. He also expressed himself as highly pleased with the prospects of obtaining pure Criollo cacao in large quantities. At present this is an impossibility, the cacao field at Copse being no doubt the largest field of any pure-bred cacao in the world.



CASTILLOA AS SHADE FOR CACAO.

On p. 105 of this volume of the *Agricultural News* brief mention was made of an article by M. P. Cibot, reproduced in the *Tropical Agriculturist* (February 1905), descriptive of cacao cultivation in Venezuela. The writer draws special attention to the possibility of carrying on rubber planting as an adjunct to cacao cultivation by using *Castilloa* trees as shade for cacao.

In view of the importance of this phase of the subject, and of the interest that has been aroused in the West Indies generally in the prospects of rubber planting, the following extracts are reproduced:—

I have recently had the opportunity in Venezuela of visiting one of the principal plantations which produce that cacao, so justly reputed, known as Caracas. I found opportunity there to study also a plantation of *Castilloa elastica* used as a shade tree.

General Fonseca, installed in the fertile valley for some twenty years, has gradually acquired the greater part of the plantations laid out in it. He owns to-day thirteen plantations, producing a total of 480,000 lb. cacao in 1903-4.

Going over General Fonseca's plantations, I could not but admire their beautiful appearance and the care taken with the irrigation of the whole property; but my attention was specially drawn to the plantation of *Castilloa elastica* mentioned above. In 1890, when they were only beginning to think of plantations of rubber trees in South America, General Fonseca was among the first to realize the value of giving as shade to cacao, in place of the trees formerly used and which served no purpose beyond that of screens, such a tree as *Castilloa*, able to furnish a valuable product. He imported 5,000 *Castilloa* seeds from Costa Rica; but these seeds, badly packed, lost their germinating powers, and only seventy seedlings could be raised. The young plants, after some months, were planted out in different parts of Las Monjas estate, amongst the cacao trees, which gave them favourable shade. These *Castilloas* developed admirably.

In 1895 these first trees fruited; the seeds were carefully collected and planted in nurseries, and in 1895-6 about 8,000 plants were put out in places where shade was wanted for the cacao trees. These trees, aged eight to nine years now, are a beautiful sight; they have attained a height of 36 to 45 feet, and have an average circumference of 33 inches.

At about four or five years the *Castilloas* easily outgrow the cacao trees and commence to give them a little shade. As they plant up *Castilloas* on the property, they kill out the 'Bucares,' or other shade trees, ring-barking them with the axe at about a yard above the ground.

The yield of *Castilloa* plantations is no longer to be doubted; the result obtained at Ocumare is a new proof, but the experiment made by General Fonseca is specially remarkable as it shows that the *Castilloa* can be grown among cacao trees without in any way harming their production. Indeed, at Ocumare they have noticed no diminution in the number of pods carried by the trees shaded by *Castilloa*, nor any change in the quality of the bean.

In the same number of the *Tropical Agriculturist* (p. 529) the following extract is published from a letter from 'a well-known planter at Matale,'

Ceylon, in which he sums up his experience in regard to *Castilloa* and cacao as follows:—

I have very large *Castilloas* growing both along roads and also scattered through cacao, the latter of about fourteen years' growth showing no evidence of prejudicial influence from the *Castilloas*. My clearing of some 30 acres of *Castilloa* and cacao, planted together six years ago, so far supports the contention that these two products may be grown together.

ADULTERATION OF MILK.

In the last issue of the *Agricultural News* (p. 206) reference was made to a report of the Government Analyst in British Guiana on the adulteration of milk in that colony. Efforts are also being made in Trinidad and Jamaica to check the sale of adulterated milk, as is shown by the following extracts from the Annual Reports on the Government Laboratories in the two colonies.

Professor P. Carmody, Government Analyst in Trinidad, makes the following reference to this matter:—

The percentage of adulterated samples has fallen from the very high figures of previous years (usually above 33 per cent.) to 19 per cent. This improvement is due mainly, I believe, to the introduction of badges, to the continued efforts of the Police Department, and particularly to the suspension of licences of sellers convicted of adulteration during the previous year. The rule at present adopted by the Board of Health is to refuse to renew the licence for three months if one conviction has been recorded during the year, six months for two convictions, and refusal of licence altogether if more than two convictions. The rule came into operation in February this year, but it has had already a most salutary effect, for the percentage of samples to which water has been added has fallen to 5.9 during the month of April, and to 12.7 for the quarter ended March 31 last. In the previous year the Board of Health did not refuse the renewal of licences, either temporarily or permanently, but only issued warnings. Samples have been taken from milk sellers in the morning and evening and on Sundays, but the adulteration of evening and Sunday milk was not shown to be greater than that of the morning supply. Contrary to usual experience in country districts, the milk supply of Princes' Town appears to be very much adulterated and requires more frequent supervision.

Dr. H. H. Cousins, in his report on the Jamaica Government Laboratory, which was briefly reviewed in the last issue of the *Agricultural News* (p. 205), writes as follows:—

The Adulteration of Food and Drugs Law of 1898 has practically remained a dead-letter until this year, when the police started to check the milk supply of Kingston. From nine such samples, three convictions for selling adulterated milk were obtained. In British Guiana and in Trinidad the Government Chemists are active in the work of detecting adulteration. In the former colony 892 samples of food and drugs were examined in 1903-4, of which 20 per cent. were adulterated, and for which fines amounting to £115 were inflicted. I have hesitated to advocate a serious campaign under the Adulteration Law owing to the limitations of the staff, and the pre-eminent claims of the agricultural work of the laboratory, but I think the time has now come when more should be done in this direction.



GLEANINGS.

The total crop of cotton at La Guerite Experiment Station, in St. Kitt's, was 976 lb. of lint, from 4 acres. This has been sold at 14½d. per lb. The total receipts from the 4 acres were therefore £58 19s. 4d., or £14 14s. 10d. per acre.

The number of plants distributed from the Botanic Station at St. Vincent during 1904-5 far exceeded that of any previous year. The total number was 29,673, of which no less than 26,256 were plants of economic importance, including 22,204 cacao plants.

The exports of cacao from St. Vincent have shown steady improvement since 1900. The number of bags exported has been as follows: 1900, 443; 1901, 528; 1902, 523; 1903-4, 702; 1904-5, 742. Previous to the hurricane of 1898, the exports of cured cacao exceeded 1,500 bags.

The total exports of sugar products from Jamaica during the period April 1, 1905, to May 27, 1905, were: rum, 363,434 gallons; sugar, 3,749 tons. This shows a decrease of 90,000 gallons of rum, and an increase of 1,000 tons of sugar over the corresponding period of last year.

In the report of the Governing Body of Harrison College, Barbados, for the year 1904, it is stated: 'The report in science is good, and the Headmaster reports that the subject is being well taken up by the boys in the higher forms, which the Governing Body think is very desirable in any community, and especially in this.'

Land at the Orphan Asylum, British Guiana, about 2¼ acres in extent, is being cultivated by the boys. Plantains, cassava, sweet potatoes, yams, and other provision crops have been planted, as well as a patch of broom corn. To the latter experiment reference has already been made in the *Agricultural News* (Vol. IV, p. 201).

Mr. W. N. Sands writes from St. Vincent: 'It would be helpful in connexion with the choice of lands for cotton planting, if records of rainfall were kept on estates. We have no records of the rainfall in the windward and leeward districts, so that we cannot ascertain how the quality and quantity of the cotton reaped is affected by rainfall.'

Mr. Millen writes from the Botanic Station at Tobago: 'At the present time there is a large demand for bulbils and plants of *Agave sisalana*. Some time ago an estate was planted up with the above fibre plant, but for want of machinery and capital it was given up, but the plants which were not destroyed are found in a good quantity in almost a wild state.'

The total amount of cotton seed selected and disinfected at St. Vincent up to June 30 was 20,973 lb. Of this amount 10,828 lb. were exported, and 10,145 lb. distributed for sowing locally. Similar returns for Barbados show that 4,809 lb. of Sea Island seed have been distributed in the island, and 1,330 lb. sent to other West India Islands.

A West Indian produce stall has been established at the Colonial and Indian Exhibition at the Crystal Palace, to which West Indian produce neatly done up may be sent for sale, subject to payment of 10 per cent. commission to the West India Committee towards expenses, and 2½ per cent. to an attendant, freight to be paid by the consigner.

Mr. A. W. Bartlett, B.A., B.Sc., the Government Botanist in British Guiana, mentions in his Annual Report that a date palm in the gardens which was blown down during the year, 'bore some apparently fertile fruit. The flowers must have been fertilized by the pollen from some other species of palm, as there was no male tree of this species flowering at the time.'

The Jamaica *Daily Telegraph* of June 24 deals editorially with the slump in the local banana market. The price dropped during the week from £10 per 100 stems to £5. With prices so low now this does not promise well for prices later when the American market is flooded with home-grown fruit. The multiplication of exportable products is therefore urged, cacao, coffee, sugar, starch, dye extract being suggested.

The lesson which our educationists and statesmen have to learn from Japan is that the life of a modern nation requires to be organized on scientific lines in all its departments, and that it must not be directed chiefly to personal ends, the attainment of which may, to a large extent, intensify many of our problems, but that it be consciously used for the promotion of national welfare. (Extract from article in *Nature* entitled 'Why Japan is Victorious.')

A recently issued report of the Committee, appointed in British Guiana for the purpose of endeavouring to find employment for the boys of the Reformatory School on their discharge, recommends that the boys should be well grounded in the operations of cottage gardening, including the processes of potting, pruning, and grafting. It would then be possible to find employment for them with house-holders who need assistance in their gardens.

The Governor of Trinidad (Sir Henry M. Jackson, K.C.M.G.) visited Carenage on June 21 to present to the Government School the silver challenge medal offered for competition by the Agricultural Society and a certificate won by the school as the best all-round exhibitor at the last Schools' Vegetable Show. A large number of people were present, and interesting addresses were delivered by his Excellency the Governor, the Archbishop, and the Inspector of Schools.

Last Easter a 'Planter's Week' was arranged by the Administrator at Dominica, with the idea that, as there is little work being done on the estates at that time, it would be interesting and helpful for planters to meet together for social intercourse. 'To that end,' writes Dr. Watts, 'a series of entertainments, including two dances, a concert, cricket matches, water sports, and other amusements were planned and most successfully carried out. The idea seems an excellent one in a country like Dominica where it is not easy for people to exchange visits freely.'



VIRGIN ISLANDS: ANNUAL REPORT ON THE EXPERIMENT STATION, TORTOLA, 1904-5.

The total expenditure for the year on this station was £654 3s. 1d. The receipts from the sale of produce, etc., amounted to £67 1s. 7d., an increase of £40 15s. 11d. over last year's receipts. A building for a cotton factory was erected during the year at a cost of £154.

A number of ornamental plants were planted out during the year; this will have the effect of rendering the station more attractive. The principal work, however, has been in connexion with the growth and distribution of economic plants; a large number of pine-apple suckers, a few cacao plants, and some 3,000 tops of seedling canes were distributed.

In the experimental plots, sugar-cane, onions, cacao, pine-apples, limes, corn, and cotton were grown. Good results are recorded with B. 208. Sugar was manufactured at the station for tenants. Some 700 lb. of onions grown in the experiment plot were sold in the neighbouring island of St. Thomas at 11s. per 100 lb. This would seem to be a suitable industry for the peasants, as considerable quantities could be sold in St. Thomas.

The report is of a satisfactory character and shows that work of a practical and useful nature is being carried on by Mr. Fishlock in the Virgin Islands.

TRINIDAD: ANNUAL REPORT ON THE GOVERNMENT LABORATORY, 1904-5. By Professor P. Carmody.

The number of samples dealt with at the laboratory shows an increase of 275 as compared with last year. The samples are classified as follows: Revenue samples, 545; criminal cases, 172; sanitary, 712; agricultural and industrial, 218; miscellaneous, 97; unofficial samples, 121.

The samples classified as 'sanitary' were principally milks; there were also included samples of aerated waters, spirits, vinegar, and butter. Reference is made elsewhere in this issue of the *Agricultural News* to the examination of milk and its adulteration. A very large proportion (61 per cent.) of the samples of aerated waters was found to be contaminated with metallic impurities likely to be injurious to health. Lead was frequently present: this was apparently due to the use of impure sulphuric acid and to the use of lead and pewter pipes, which should be discontinued.

Samples of milk, molascuit, grass, and soil were examined for the Government Stock Farm, the milk being tested weekly.

Samples of camphor from the Botanic Department were also dealt with. The dry leaves yielded 3.2 per cent.; the twigs, 0.04 per cent.; and the wood only traces. Seventeen sugars were polarized for the Agricultural Society in connexion with the local exhibition. One polarized 98.6° and being an excellent sample of the art of crystallizing sugar, was awarded first prize.

Courses of lectures on chemistry were given at the Royal and St. Mary's colleges, and teachers from training schools received agricultural instruction at the laboratory.

BRITISH GUIANA: ANNUAL REPORT ON THE BOTANIC GARDENS, 1904-5. By A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist.

During the year under review 23,044 plants of various kinds were raised in the nursery and planted in the Botanic Gardens.

The Sea Island cotton plots were not very successful; the results with Egyptian varieties were more encouraging. Mr. Bartlett is in favour of further experiments being tried with the latter, as it appears to be better adapted to the climate and soil conditions of the colony.

Onion seed from Tenerife was distributed to a number of people in the colony: it appears that in the lighter soils of the colony onions grow well, and their cultivation should prove profitable if an effort is made to supply the local market when the price is high.

The receipts during the year amounted to \$901.14, and were considerably below those of the previous year: 10,627 economic plants were supplied from the nursery at the average price of 1½ c. each. 'It is to be regretted that a more extensive use is not made of the facilities afforded by the Government for supplying the people of the colony with a large variety of useful plants at the lowest possible prices.'

Mr. Bartlett's report shows that much useful work is being done in the Botanic Gardens and contains an abundance of interesting information in regard to the plants and crops grown.

STACK ENSILAGE.

Mr. Alfred H. d'Costa contributes to the *Bulletin of the Department of Agriculture, Jamaica*, the following note on making corn ensilage in stacks:—

Plant 3 acres of guinea corn, red dhurra or native corn and cultivate until the grains of corn are just soft enough to be crushed between your fingers. The corn is then in the best stage to make ensilage.

Erect eight poles 10 feet high to outline your stack and wattle the sides to help even packing. A stack 16 feet by 10 feet is a suitable size for 3 acres of corn. Leave two openings in the sides of the stack, one at either side, to be used as doors.

Start cutting the corn early in the morning, one man cutting, two men and two carts carting, and one man to pack, you yourself remaining in the stack to direct the packing and give a help with the handing up of the corn.

Spread about a foot of grass on the ground and see that it is quite level.

With the first load of corn brought in by the carts start packing and pack as tightly, and as level as you can; be sure and pack the sides tightly, as the great object is to keep out the air and it is more likely to get in from the sides than anywhere else. Pack right up to the wattle and be sure that you leave no air spaces; wherever you notice a small hole, cut some of the corn and push it in and always pack level. Continue to pack evenly until you have used all your corn, then cover the top with 1 foot of grass spread evenly, and pile on all the stones and logs you can get on top to weigh down the stack.

After you have got on the weights take down the wattle and draw away the side poles and so leave the stack free to settle down.

The stacking of the corn may take from two to three days, and the ensilage will be ready for use in about two months' time.

EDUCATIONAL.

Agricultural Schools.

The following are the reports of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.) on the half-yearly examinations at the St. Vincent, St. Lucia, and Dominica Agricultural Schools:—

ST. VINCENT.

Of the eight senior boys who took the examination in December 1904, four have left; the remaining four constitute the present senior class. There are now fourteen boys in the junior class; nine of these have been admitted since the last examination. Two of the seniors will have completed their term in September of this year, but I do not think it advisable for the present to promote any of the juniors.

The senior boys have done their work very well. Wright is decidedly the best, especially in the agriculture and science papers. He has improved on his position in the last examination, obtaining over 75 per cent. of the total marks. Harry and Yorke have both obtained over 66 per cent. Longheed has obtained the same marks (58 per cent.) as at the last examination. The agriculture is the best of the more important papers in the senior class, but there is no wide difference between it and the other papers.

Of the fourteen juniors, nine have obtained over 50 per cent. of the total marks. Of these four are new admissions. McConnie, a new boy, is head with 75 per cent. of the total marks. Falby has also done very well, and is the only other boy to obtain over 66 per cent. The pupils who sat at the last examination have all obtained higher marks this time. The five boys who received less than 50 per cent. are all new admissions. In this class, the arithmetic paper is by far the best; geography and agriculture are next, while the chemistry and botany are weaker still. A decided improvement in the agriculture and science papers is to be looked for when the boys have been longer at the school.

In both classes, the tendency to verbosity, noticeable at the last examination, is much less marked.

ST. LUCIA.

Since the last examination one of the senior boys has left and three boys have been promoted from the junior class. There are now twelve senior and seven junior pupils. All the present junior boys took the last examination as new boys and were not classified.

The work of the senior class is very uniform, and is of a high standard: seven boys have obtained over 66 per cent. of the total marks, while the remaining five have all obtained over 50 per cent. Flavien and Goring, who were at the head of the class in the December examination, are now bracketed top with DuBoulay; Goring has done slightly better than the other two in the agriculture and science papers: DuBoulay has considerably improved his position. The three boys promoted from the junior class come last in the list. As in the last two examinations, the botany is the weakest paper, the chemistry coming next: both these papers, however, show a distinct improvement over the December ones. As usual, agriculture is the best of the more important papers.

In the junior class only one boy, Girard, has obtained over 66 per cent. of the total marks. Regis has also done well and comes second. Gabriel is the only boy to obtain less than 50 per cent. The arithmetic paper is excellent. The chemistry, agriculture, and botany papers are the worst,

and are decidedly weak, especially the last two. This is only to be expected as this is the first time these boys have taken these papers at an examination. More attention should be devoted to the lessons of the junior class in agriculture and science.

DOMINICA.

As at the last examination, and as recommended in my last report, all the pupils have taken papers set for the junior class. With the exception of Roudette, who has left since December, the pupils are the same. For the present, they had all better continue with the junior work.

Cuffy has again done very well and is head: both he and A. T. Pinard have obtained 75 per cent. of the total marks; Pinard has considerably improved his position since the last examination. Four other boys have obtained over 66 per cent. of the total marks, while nine others received more than 50 per cent. The four boys at the bottom of the list are G. N. Pinard, Lawrence, Peltier, and Sunny; G. N. Pinard, Sunny, and Lawrence occupied the same position in the last examination.

The arithmetic is the best of the more important papers. The agriculture and science papers are also fairly good. Chemistry, which was the weakest paper last time, is distinctly better, and about equal to the botany and agriculture.

A tendency is noticeable in many of these papers to learn off the notes of lessons by heart and repeat them as answers to questions. This often results in the questions not being thoroughly answered; also, when the boys try to express their own thoughts, they fail to do so intelligibly. They require more practice in writing short essays on subjects not dealt with in their written notes. They should also be encouraged to think for themselves and discouraged from learning their notes (which should be used for reference only) by heart.

TRADE IN THE WEST INDIES.

The following is an extract from the speech of the Chairman of the Royal Mail Steam Packet Company at the annual general meeting of the company on May 24:—

The West Indian Colonies had for some years been under a cloud, but the depression seemed at last to be passing away, and he hoped that there might be a brighter future in store for them and also for the company, which had served them so well both in times of prosperity and in times of adversity. The West Indian mail service had been performed with regularity, and notwithstanding the severe competition, the traffic by the company's steamers had increased. They had continued to do all in their power to assist in the development of the latent resources of the West Indian Colonies. The Imperial Department of Agriculture, under Sir Daniel Morris, had been successful in restarting the old West Indian industry of cotton growing; and to encourage this important industry the company were carrying the cotton at a low rate of freight. They had also conveyed a considerable amount of West Indian fruit and had held two exhibitions of West Indian fruits in London in order to bring the products of the West Indies before the English public. A Royal Charter of incorporation had recently been granted to that old and representative body, the West India Committee, under whose active Secretary a West Indian exhibition had just been opened at the Crystal Palace. In order to assist the colonies concerned the company had agreed to carry all exhibits for it freight free.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice markets for the month of May has been received from Mr. J. R. Jackson, A.L.S. :—

The condition of the drug and spice markets during the month of May has shown slightly more action than in preceding months, and it is worthy of remark in this connexion that at the spice sales Jamaica ginger experienced a remarkable advance, especially amongst the higher qualities. The following are some of the details affecting West Indian products :—

GINGER.

At the first auction, on the 3rd. of the month, as many as 482 barrels and 37 bags of Jamaica were offered, of which 310 packages were sold at prices ranging from 29s. to 47s. At the same sale Cochin was offered to the extent of some 1,000 packages, 100 of which were sold at 18s. for small plump mouldy. A week later Jamaica had advanced 2s. to 3s. per cwt., 120 barrels of low medium selling at 46s., while 38s. 6d. to 41s. was paid for common to good common. At the third sale, on the 17th., there was an extremely good demand for Jamaica; 800 packages were offered and 600 sold at the following rates: good to fine, 50s. 6d. to 67s. 6d., one lot realizing as much as 74s.; small to fair washed, 41s. 6d. to 48s.; fair to good common, 35s. 6d. to 40s.; common, 33s. to 34s. 6d.; rough common, 30s. to 30s. 6d.; ratoon in barrels and bags, 29s.; and common small, 32s. to 33s. There was no demand for Cochin and Calicut. At the last sale, on the 24th., Jamaica was still in good demand, prices ranging from 1s. to 2s. advance on the previous rates. Three hundred barrels were offered and disposed of, while there was still no demand for Cochin.

ARROWROOT.

At the first sale, on the 3rd., some 300 packages of St. Vincent were offered, all of which were bought in at 1¾d. for good manufacturing. None was offered in the following week, but on the 17th. 665 barrels of St. Vincent were offered, and 475 sold, of good manufacturing, at from 1¾d. to 17d. per lb. Twelve half-barrels of Bermuda were also disposed of at 1s. 11d. to 2s., and in the following week, 1,046 barrels of St. Vincent were offered and 400 sold, good fair at 2d.; and good manufacturing at 1¾d.

NUTMEGS, MACE, AND PIMENTO.

At the beginning of the month some 197 packages of West Indian nutmegs were offered and disposed of at steady rates agreeing with those of the preceding month, and but little or no change occurred either in prices or demand afterwards. The demands for and sales of mace were also steady, realizing at the first sale 1s. 8d. for bold pale West Indian; 1s. 6d. for good bold; 1s. 2d. to 1s. 3d. for ordinary to fair mixed; and 1s. 1d. to 1s. 2d. for red. For the remainder of the month mace was dull of sale. In pimento but little interest was shown: fair quality realized 2¾d. at the first sale of the month, small sales of which were made at the same rates at succeeding auctions.

SARSAPARILLA.

The market opened with the arrival, amongst others, of 15 bales of Lima-Jamaica, and 6 bales of native-red, but no grey Jamaica came to hand. Mexican was quoted at 4½d., and Lima was held at 1s. A week later Lima-Jamaica was

offered and sold at an advance of 1d. per lb. At the same sale, middling red native Jamaica sold at 7½d. to 8d. At the last auction 25 bales of grey Jamaica were offered and all disposed of at prices from 1s. 2d. to 1s. 3d. per lb. Five bales of native Jamaica were also offered, consisting of bright palish yellow, and fair reddish to pale, 8d. per lb. being offered but refused.

ANNATTO SEED, LIME JUICE, KOLA, ETC.

At the beginning of the month annatto seed was reported as scarce, being held at 7d. per lb.; a week later 2 bags of fair bright East Indian sold at the above price, and 1 bag of Calicut at 5½d. At the end of the month good bright Madras, rather damp, sold at from 6d. to 6½d.

Cassia Fistula was offered at the auction on the 11th., 4 bags of good bold fresh West Indian being disposed of at 20s. per cwt.

At the same sale 13 bags of kola, comprised of small to medium West Indian mixed with African, were disposed of at 3¼d. to 3½d. per lb.; and 2 bags of slightly wormy West Indian fetched 4½d. per lb.

Lime juice was offered on the 18th., 10d. to 1s. per gallon being paid for good raw West Indian, lower prices ruling for commoner qualities. On the 25th., 2 tons of damp West Indian quassia chips were offered but held at £6 10s. per ton.

In connexion with the subject of the possibility of a trade being established between the West Indies and the mother country in orange peel, referred to on pp. 93 and 119 of this volume of the *Agricultural News*, it may be stated that on the 11th. of the month some small sales of Maltese and Tripoli strip peels were made at 5d. per lb.

United States.

The *Consular Report* on the trade of Philadelphia for 1904 contains tables showing the imports into that city from the British West Indies, from which the following information is extracted :—

Bananas were imported to the value of £88,853; coconuts, £11,450; logwood, 2,681 tons, valued at £7,420. These articles were imported free of duty.

The following articles, subject to duty, were also imported: oranges, 1,765,426 lb., of the value of £4,463; other fruits, £699; salt, £3,197; asphalt, £1,972; hats, £319.

Austria-Hungary.

It appears from the *Consular Report* on the foreign trade of Austria-Hungary that the trade between the Dual Monarchy and the British West Indies is of considerable dimensions. The following brief review of the tables published in this report is likely to be of interest :—

The total value of the imports into Austria-Hungary from the British West Indies in 1904 was £61,117, as against £60,858 in the previous year; the exports to the British West Indies were valued at £5,624 in 1904 and £3,028 in 1903.

The principal imports are classed as follows: colonial goods, £31,760; beverages, £11,940; spices, £6,249; minerals, £2,754; gums and resins, £2,413; dyeing and tanning materials, £1,788.

The exports comprised wooden and bone-ware, metals, paper goods, etc.

MARKET REPORTS.

London,—June 20, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 14, 1905; and 'THE PUBLIC LEDGER,' June 17, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 13/- to 45/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
 BEES'-WAX—£7 5s. to £7 10s. per cwt.
 CACAO—Trinidad, 56/- to 62/- per cwt.; Grenada, 53/- to 54/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.
 COTTON—West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—5/6 to 6/- per bunch.
 ORANGES—No quotations.
 PINE-APPLES—Antigua, 12/- to 15/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, fair to good bold, 60/- to 69/-; low middling to middling, 48/- to 58/-; ordinary to good ordinary, 40/- to 46/- per cwt.
 HONEY—17/- to 26/6 per cwt.
 ISINGLASS—West Indian lump, 2/3 to 2/8; cake, 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 11d. to 1/1 per gallon; concentrated, £15 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/6 to 1/7 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair to good pale, 1/3 to 1/5; fair red, 1/1 to 1/2; per lb.
 NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.
 NUTMEGS—63's 1/4; 80's, 10d.; 94's, 8d.; 100's, 6½d. per lb.
 PIMENTO—2½d. to 2¾d. per lb.
 RUM—Demerara, 1s. 3d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.
 SUGAR—Yellow crystals, 17/6 to 19/6 per cwt.; Muscovado, Barbados, 17/6 per cwt.; Molasses, 12/6 to 16/6 per cwt.
 SULPHATE OF AMMONIA—£12 15s. per ton.

Montreal,—June 10, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

BANANAS—8 hands, \$1.10; Jumbos, \$1.50.
 COCOA-NUTS—Jamaica, \$23.00 to \$25.00; Trinidad, \$20.00 to \$22.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 35c.; Antigua, 30c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 19c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5c. to 5¼c. per lb.
 PINE-APPLES—Cuban, 24's and 30's, \$2.50.
 SUGAR—Grey crystals, 96°, \$2.87½ to \$3.00 per 100 lb.
 —Muscovados, 89°, \$2.25 to \$2.50 per 100 lb.
 —Molasses, 89°, \$2.00 to \$2.25 per 100 lb.
 —Barbados, 89°, \$2.10 to \$2.35 per 100 lb.

New York,—June 23, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11¼c. to 15c.; Grenada, 11c. to 11½c.; Trinidad, 12c. to 12½c. per lb.
 COCOA-NUTS—Jamaica, \$22.00 to \$23.00; Trinidad, \$19.00 per M.
 COFFEE—Jamaicas, 8c. to 8½c. per lb. (ex store).
 GINGER—Jamaica, 6c. to 8½c. per lb.
 GOAT SKINS—Jamaicas, 59c. to 59½c. per lb.
 GRAPE FRUIT—Jamaicas, \$3.00 to \$4.00 per case.
 MACE—31c. to 35c. per lb.
 NUTMEGS—West Indian, 80's, 23c.; 110's, 14c. to 15c.; 130's, 11c. to 12c. per lb.

ORANGES—\$2.25 to \$2.50 per case; \$4.50 to \$5.00 per barrel.

PIMENTO—4½c. per lb.

PINE-APPLES—\$2.00 per crate.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3½c.; to 3¼c.; Molasses, 89°, 3¾c. to 3⅞c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 28, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—25c. per gallon, package included.

SUGAR—89°, \$1.80 per 100 lb.

Barbados,—July 1, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.40 to \$3.50 per 100 lb.

CACAO—\$12.00 per 100 lb.

COCOA-NUTS—\$12.50 per M. for husked nuts.

COFFEE—\$10.00 to \$11.75 per 100 lb.

HAY—\$1.05 to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$1.29 to \$1.50 per 100 lb.

POTATOS, ENGLISH—\$2.80 to \$3.50 per 160 lb. (retail).

RICE—Ballam, \$4.45 per bag (190 lb.); Patna, \$3.10 per 100 lb.

SUGAR—Muscovados, 89°, \$1.90 per 100 lb.

British Guiana,—June 29, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 12c. per lb.

CASSAVA STARCH—\$4.50 to \$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Rio and Jamaica, 13¼c. to 14c. per lb. (retail).
 —Creole, 12c. per lb.

DHAL—\$3.70 to \$3.75 per bag of 168 lb.

EDDOES—\$1.00 to \$1.32 per barrel.

MOLASSES—Vacuum pan yellow, 16c. per gallon (casks included).

ONIONS—Tenerife, 3¼c. per lb.

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—10c. to 32c. per bunch.

POTATOS, ENGLISH—Bermuda, \$3.00 to \$3.50 per barrel (retail).

POTATOS, SWEET—Barbados, \$1.92 per bag; \$1.92 per barrel.

RICE—Ballam, \$4.20 to \$4.25 per 177 lb.; Creole, \$3.90 per bag.

TANNIAS—\$1.68 per barrel.

YAMS—White, \$2.08 per bag.

SUGAR—Dark crystals, \$2.70; Yellow, \$3.40 to \$3.50; White, \$4.50 to \$4.75; Molasses, \$2.50 to \$2.60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.50 per M.

Trinidad,—June 28, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.50; estates, \$11.50 to \$12.00 per fanega (110 lb.); Venezuelan, \$12.25 to \$12.60 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—67c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9¼c. per lb.

COPRA—\$2.75 per 100 lb.

ONIONS—Stringed, \$2.00 to \$2.20 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.30 to \$1.40 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; white, \$4.75 to \$5.75 per bag.

SUGAR—White crystals, \$4.00; Yellow crystals, \$2.75 to \$3.00; Molasses sugars, \$2.50 to \$3.00 per 100 lb.



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Arbor Day.

IN view of the fact that preparations are likely to be made shortly for celebrating Arbor Day in the West Indies, it may be useful to discuss briefly some points in connexion with this movement.

The King's birthday (November 9) has been more or less generally adopted as the day for observing Arbor Day in the West Indies. At Jamaica and elsewhere Victoria Day has been tentatively adopted for the purpose. Last year Arbor Day was celebrated with conspicuous success on the King's birthday at Antigua, Dominica, Montserrat, Nevis, and St. Kitt's. It would appear that that date is an appropriate one to be chosen for this purpose on account of its being a Public Holiday for the observation of the birthday of His Majesty the King, who has always evinced so lively an interest in tree planting, while, at the same time, it is usually a seasonable one for planting operations. In most of these islands showers are expected in November and the trees planted at that time would, in most cases, have at least a couple of months, and possibly more, in which to make a start before the setting-in of the dry season.

It is recommended that those islands which have not, as yet, formally set apart an Arbor Day should join in the movement, and that the King's birthday be generally adopted as the occasion for the systematic planting of trees.

It is probably well known to readers of the *Agricultural News* that the local officers of the Imperial Department of Agriculture have given very material assistance in connexion with Arbor Day celebrations. The direction in which this assistance has been most appreciated has been in raising and supplying plants. In almost all cases the young trees planted have been raised at the Botanic Stations. Assistance has also

been given in regard to the selection and the preparation of the land and in caring for the young trees afterwards.

It is desirable that committees should be appointed as soon as possible, so that the detailed arrangements for the celebrations may be well in hand. This will enable the officers in charge of Botanic Stations to ensure an adequate supply of suitable plants. At the same time proper sites for planting will have to be chosen. This must be done with due regard to the character of the trees which it is decided to plant. The trees most commonly chosen for this purpose are palms (principally the cabbage palm and the royal palm, *Oreodoxa oleracea* and *O. regia*), mahogany, white-wood (*Bucida Buceras*), and, in one instance that has been reported in the *Agricultural News*, viz., in Dominica, *Castilloa elastica* for planting along the side of the public road. There is a wide choice of suitable trees in the West Indies both for ornamental and shade purposes. There are also several very desirable fruit trees for gardens and orchards.

In order to give the young plants every possible opportunity of making rapid growth, and of fulfilling the purpose for which they are planted in the shortest possible time, special attention should be given to the preparation of the land. This should be commenced, if possible, early in October. Holes, at least 3 feet square and 2½ feet deep, should be dug; these, after a few weeks' exposure to climatic influences, should be carefully filled with good *top* soil. Where, however, the soil is poor or of a rocky nature, a plentiful supply of well-rotted stable or pen manure should be mixed with the soil.

After the young trees have been planted, some protection must be afforded against cattle, goats, and fowls. This will best be secured by the erection of tree guards, which may conveniently be made of three strong posts around which wire netting is fastened, or the staves of a barrel may be used for the purpose. Arrangements should also be made for watering the plants, if necessary, and for subsequent weeding and general attention to their requirements.

With regard to the objects of Arbor Days, it should be clearly understood that in urging its observance the Imperial Department of Agriculture has in view mainly its educational influence. There is no intention to connect it with schemes of re-forestation. The general lines which it is intended Arbor Day should serve were stated by the Imperial Commissioner of Agriculture at the West Indian Agricultural Conference in Trinidad as follows:—

'What we hope to accomplish is this: To have a few special trees planted on certain days in order, not merely that children may develop the desire to perpetuate an event by the planting of a tree (handed down from the earliest times), but that they should always have presented before them all the details necessary in order to prepare the ground and look after the tree until it is thoroughly established. That, from an educational point of view, would be a valuable acquisition for the individual as well as for the community. I can understand that some people may think that an Arbor Day is not necessary where vegetation is already abundant, but the idea is to plant a few *special* trees and keep them continually under observation in order to illustrate in a practical form the methods and conditions best adapted for plant life.'

While, however, the main idea is to be educational, the movement may serve a utilitarian purpose in beautifying the appearance of roads or open spaces and in affording delightful shade from the torrid heat of the sun. Thus in Barbados, where Arbor Day has not, so far, been observed, it has been suggested that, in addition to affording object-lessons to children in the proper treatment of trees, Arbor Day celebration might be taken advantage of to transform some, at least, of the white, glaring roads into shady avenues, thus adding to the general comfort and well-being of the community.

The great advantage in regard to the observance of an Arbor Day is that a small expenditure, only, is necessary, in a tropical climate, to produce pleasurable and lasting results.

JAMAICA BOTANICAL DEPARTMENT.

The *Jamaica Times* of June 17 has the following editorial note on the work of the Department of Public Gardens and Plantations, especially in reference to the tobacco experiments:—

It is with sincere pleasure that we learn that the experiments in tobacco growing, recently conducted at Hope by Mr. Fawcett's Department, have now reached very definite success. The experiment was under the immediate direction of Mr. Cunningham, who has set out the history of its conditions clearly and usefully in a report for which we hope to find space in another issue.

While we are on the subject of Mr. Fawcett's Department, we take the opportunity of expressing the appreciation with which we and others have watched his wise and persevering efforts to recommend Agricultural Loan Banks, on a voluntary basis, to our people. We try never to say more than we feel, and our readers know that we do not think that the Department of Public Gardens fulfils in all things the work we want done; but that does not mean that it does not in many directions do good and useful work, while, personally, it is always pleasant to have to do with the Director himself, who sets an example of courtesy and gentlemanliness that all officials would do well to copy.



SUGAR INDUSTRY.

Java.

The following extract from the *Consular Report* on the trade of Java for 1904 reviews the position of the sugar industry in that island:—

The steady increase of sugar during the past years has been well maintained, the total production amounting to 1,064,935 tons. Although this is attributable, to a certain extent, to the favourable weather, the most important factors have undoubtedly been the scientific application of artificial manures to the older grounds and the careful selection of the species of cane best adapted to the peculiarities of the various soils, resulting from a long series of experiments at the Experiment Stations at Pasoeroean and Pekalongan. These institutions have proved their value to the industry and are well supported by the planters.

Several of the new species of cane raised from seed in the nurseries of the East Java Experiment Station at Pasoeroean have been amongst the most productive. It is worthy of notice that a few of these species which have been reared from canes that have been in cultivation for more than fifteen years, and have latterly been relegated to a minor portion of the fields, have proved to be the most fertile. This strengthens the faith placed in the seed-cane generally; notwithstanding the disappointment some of the varieties have caused.

The process of cane selection still engrosses the attention of planters, and in many quarters it is believed that in this direction a means will be discovered further to enhance the production.

The following shows the production in each of the past six years:—1899, 730,842 tons; 1900, 710,150; 1901, 766,342; 1902, 848,021; 1903, 883,020; 1904, 1,064,935.

With regard to cane diseases, Mr. Acting Vice-Consul Rose reports as follows:—

‘The well-known cane diseases still continue, but seem to be held in check by the measure now being rigorously and uninterruptedly taken to extirpate them. The “yellow stripe” disease, however, is one for which planters have as yet discovered no remedy. It appears to be propagated or retarded according to the weather conditions. At one period of the year it threatened to work havoc among the young canes, but fortunately an opportune change in the weather effected a complete recovery.’

The profits of the past year’s working are now in many cases being expended on new machinery and in bringing the mills up to date, by which means planters hope to reduce the cost of production.

The demand for nitrogenous manures shows a steady increase during recent years. This is, to a certain extent, due to the fact that a liberal use of fertilizers has been proved not only to be of much benefit to the sugar-cane, but has in no small degree tended to lessen the ravages of the ‘sereh’ disease, which at one time threatened to devastate the cane crops of the island.

The exports of sugar of all kinds from Java and Madura during the years 1902-4 have been as follows: 1902, 808,457 tons; 1903, 869,295 tons; 1904, 1,010,742 tons. More than 50 per cent. of the total exports of sugar went to the United States.

GRENADA AT THE COLONIAL EXHIBITION.

Mr. Freeman’s article in the last issue of the *West India Committee Circular* deals with the Grenada exhibit. After reference to the cacao exhibits, he says:—

Spices rank next in importance to cacao among the products of Grenada, the actual figures for 1903 being: cacao, £230,957; spices, £31,594. Well-preserved nutmegs, as they drop from the trees, are exhibited, showing the fleshy, somewhat peach-like fruit burst open along one side, displaying the nutmeg in its hard, brown case, partially covered by the brilliant, orange-red mace. Nutmegs and mace, in the familiar dry condition in which they come on the market, are also shown. The other spices represented include ginger and cardamoms.

Cotton stands third in the list of Grenada exports. The value of cotton and cotton seed exported in 1903 was about £5,300. Grenada for many years was apparently the last stronghold of the former important cotton industry of the West Indies, owing to cotton having remained throughout a staple product of Carriacou, one of the dependencies of the colony. Some samples of Sea Island cotton are exhibited, but there is no information as to whether they were grown in Grenada or in Carriacou.

With cotton we come to the end of the chief products of Grenada, no other, with the exception of live stock, contributing more than a few hundred pounds towards the total value of the island’s exports. Although not exported to any large extent, there is a small intercolonial trade in fruit carried on between Grenada and some of the other West India Islands, and the fame of Grenada oranges is by no means confined to their place of production.

Specimens of mangos, granadilla, cashew nuts, limes, water melons, preserved so as to retain their fresh appearance, and a large series of preserves, including some very nice-looking fruit jellies, sufficiently represent the capabilities, actual and potential, of Grenada fruit production. Cocoa-nuts are also exhibited.

Cassava cakes alone represent the farinaceous products of the island. Amongst other plant exhibits of minor importance are ornamental seeds with pendants, charms, and other objects, showing how they may be utilized, pickles, palm-leaf duster-brushes, straw hats, a large wooden pestle and mortar for pounding cassava, etc., and a nest of those strong Carib baskets which can be put to so many uses in the West Indies.

A series of tanned skins is perhaps the most important item to notice under the head of animal products. Of great interest to many will be the stuffed specimens of mungoose, the animal whose introduction, originally to serve a useful purpose, has had such a baneful effect in many parts of the West Indies. Corals, sea fans, fish, conch shells, stuffed birds, sea urchins, and a monkey are of interest in exhibiting some of the more characteristic forms of animal life of the colony. A series of Carib implements brings us into touch with the earlier inhabitants of Grenada.

Undoubtedly the whole exhibit does great credit to Mr. P. J. Dean, Chairman, and Mr. C. Falconer Anton, Secretary of the local committee. Although comparatively small, the Grenada exhibit should serve a useful purpose in demonstrating the actual and possible sources of prosperity of one of the most flourishing of the West India Islands.



WEST INDIAN FRUIT.

BARBADOS BANANAS.

The following is an extract from a letter from Messrs. William Pink & Sons, dated Portsmouth, June 29:—

The prices of Canary and Jamaica bananas have been lowered considerably but the Barbados fruit is being sold at the ordinary rates, owing to the great demand for it, and the small supply.

We are improving our Plymouth stores by putting in a rapid mechanical hoist to raise the crates to the ripening rooms, and are also putting in a powerful ventilating fan, which will be capable of changing the air of the rooms every fifteen minutes, which will enable us to keep the fruit longer in the hot weather than we can now do.

THE CITRUS INDUSTRY OF SICILY.

The following information on the citrus industry of Sicily is extracted from the *Consular Report* on the island for 1904:—

Formerly the citrus trade was one of the principal resources of the island, but since the cultivation of oranges and lemons in California and Florida, Sicily has lost a great part of her former prosperous trade in green fruits. Every now and then, cold snaps in the United States set back the citrus trees there and give Sicily a couple of years of profitable trade. Fortunately for the new season in Sicily, recent frosts in Florida have hardened prices; the crop here is not a very abundant one this year, and it is yet too soon to gauge the prospects for next season. Sicily may now look forward to a couple of seasons of good demand.

GREEN FRUIT TRADE.

During the 1903-4 season it was calculated that all Italy produced 5,250,000,000 of fruit, or an excess of 750,000,000 over the preceding season. To this total production Sicily contributed 3,652,800,000 or more than half of the production of all Italy. Out of 16,700,000 citrus fruit trees in all Italy, Sicily accounted for 10,390,000. On an average each Sicilian tree is calculated to produce 352 fruits.

CANDIED AND PICKLED FRUIT.

Besides the trade in oranges, lemons, mandarins, and citrons, there is a considerable Sicilian production of fine candied fruits. Unfortunately, the cost of sugar to the manufacturer of these is such that there is no field for a profitable export trade.

Oranges sold in the street or at the popular marionette

shows are invariably peeled, and the peel is then sun dried for export. Seville oranges in brine and halved are exported from Messina and Syracuse. No drained oranges are produced in Sicily. This trade seems to be limited to Leghorn.

ESSENCE OF LEMON, OIL OF LEMON, ETC.

A good quantity of essence of lemon is produced in Palermo and all along the eastern coast of Sicily.

Oil of lemon, oil of orange (both bitter and sweet), oil of mandarin, and oil of cedrat are produced in various parts of the northern and eastern coasts. Those interested in these products should refer to Mr. J. F. Child's article in the *Chemist and Druggist* of January 26, 1901, 'Where the Lemons Grow.' Messrs. H. E. Burgess and J. F. Child further published an account of the 'Lemon Oil Industry' in the *Journal of the Society of Chemical Industry*, December 31, 1901, No. 12, Vol. XX; and some up-to-date notes on the 'Citron Oil Industry' on January 31, 1903.

CITRATE OF LIME AND CITRIC ACID.

Citrate of lime is produced at Palermo, Messina, and Catania. Efforts are being made to create a combination in this article.

Citric acid has hitherto been produced by the Scheele method. At Palermo a new combination has been formed under the title of 'La Citrica' for the production of citric acid by a method due to a Sicilian called Restuccia, whose process is said to be a modification of one discovered by F. Arrosto in 1834. It remains to be seen whether the Restuccia method is a commercial success.

SHIPMENT OF ONIONS.

Onions are shipped from Montserrat in barrels and not in crates, as has been sometimes suggested. The reasons for this are given by the Local Instructor as follows:—

Onions are never shipped in crates, as the West Indian and neighbouring markets desire the onions stringed, and the standard size of the onion crates will not allow of economic packing in this manner. If the crates were larger, say, to hold 150 lb. of stringed onions, then this method might command attention. An onion crate holds 150 lb. of loose onions and little more than half that quantity on strings, while a barrel holds 135 lb. to 150 lb. of stringed onions. The price of a barrel varies from 8d. to 1s., while crates are 7d. each; again, the freight is in favour of the barrel, these costing 1s. each, while crates cost 6d. each. So that, providing loss through shipment can be prevented in barrels, this is much the cheaper method of packing.

SCIENCE NOTES.

Roots of Cotton Plants.

Mr. J. R. Bovell, F.L.S., F.C.S., and Mr. Thomas Thornton, A.R.C.S., have been carrying out investigations at Barbados with regard to the character of the roots of the cotton plant.

In reporting some very interesting results they state:—

The roots of plants examined have been measured, and the average depth to which the primary roots penetrated was 19 inches, the maximum being 24 inches, and the minimum 14 inches.

The secondary roots commenced on the average to be put off at 3·4 inches below the surface of the soil, the maximum being 5 inches, and the minimum 1·5 inches. The secondary roots were, on the average, traced to a distance of 45 inches; the maximum being 63 inches, and the minimum 39 inches. The longest secondary roots, at some distance below the surface of the soil, were on the average 11 inches deep; the maximum being 15 inches, and the minimum 8 inches. They were traced horizontally on the average for 31 inches; the maximum being 48 inches, and the minimum 18 inches.

Soil Inoculation for Legumes.

The following review of a recently issued bulletin (No. 71) of the Bureau of Plant Industry of the U. S. Department of Agriculture, by Dr. G. T. Moore, entitled 'Soil inoculation for legumes,' appeared in the *Botanical Gazette* for June:—

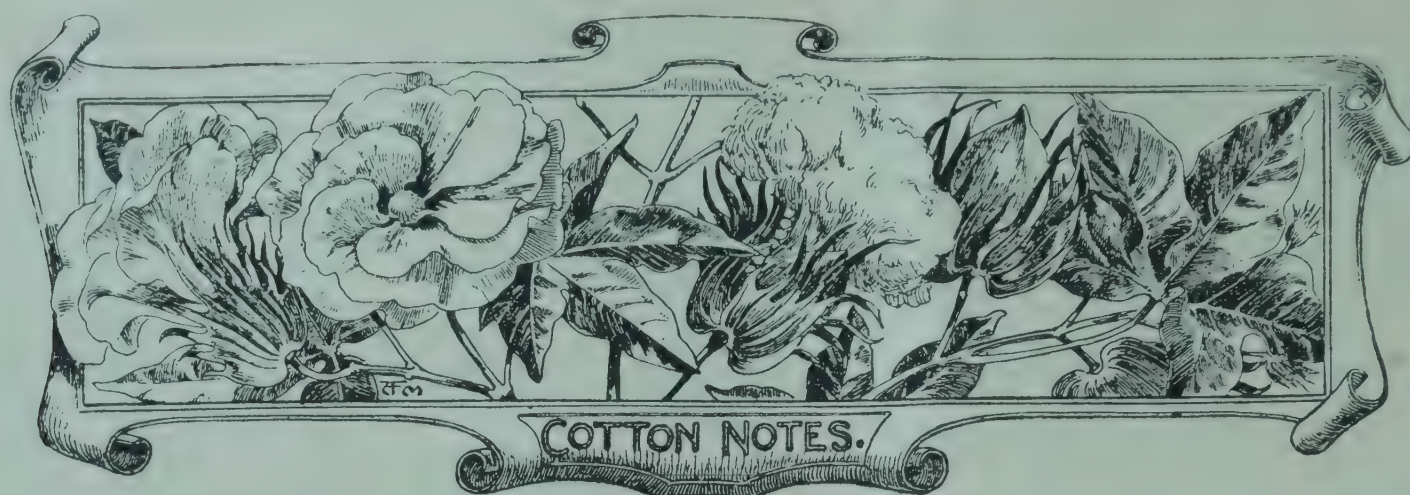
The subject of soil inoculation for legumes has recently acquired a wide-spread interest in this country, first from numerous popular accounts relating to the subject, and again on account of a widely advertised commercial product by which, it is claimed, the proper bacteria can be introduced into the soil. For this reason Moore's account of his work in this field is of special interest. The first part of the bulletin is a general historical account dealing with the various methods by which nitrogen is fixed in the soil, and leading up to the discoveries of Helriegel and Willfarth connecting the fixation of nitrogen by legumes with the tubercles on the roots, and the discovery of bacteria in these tubercles by Woronin. The chief results of Moore's investigations may be briefly stated as follows: The root-tubercle organism exists in three well-defined forms. In the soil it has the form of extremely minute motile rods. These possess the power of infecting the root hairs of leguminous plants. Within the root the organisms multiply enormously and produce the hypha-like 'infection threads' passing through the tissues of the host. These curious fungus-like structures have often been observed and figured, and have been the objects of much discussion. Their explanation is that they are zooglaea-masses composed of numerous minute bacteria. These minute bacteria soon give rise to larger rod-shaped forms which may or may not be motile. These finally produce the branched forms peculiar to the legume nodule. It is only this last form that is of any benefit to the plants, for in this state the bacteria are broken down, and their contents made available. The name of the organism is changed to *Pseudomonas radiculicola*, since the motile rods have flagellae only on one end. There is only a single species, but several forms or races occur adapted to certain species of legumes. Their slight racial characteristics may

be easily broken down by cultivation. The results of studies on the nitrogen-fixing power of the bacteria are extremely interesting, showing that the supposed symbiotic relation between the organism and the root probably does not exist. It is rather to be regarded as a parasite, its nitrogen value being merely incidental to the death of the organism. The nitrogen is fixed by the tubercle-forming bacteria within their bodies. This was determined by cultures in flasks containing nutrient solutions without nitrogen. There was no increase of nitrogen in the solution, but a marked increase in the organisms themselves. In its biology the organism is therefore considered a parasite. Later the plant is able to overcome the parasite and profit by the nitrogen which has been fixed. When grown on nitrogenous media, it was found that the organism lost both its power of infecting leguminous plants and its power of fixing nitrogen. In non-nitrogenous media both of these properties were retained. The failure of Nobbe's attempts in Germany, a few years ago, to put upon the market pure cultures of this organism can probably be attributed to lack of recognition of this fact. As a result of these studies Moore has devised a method of putting up for distribution pure cultures of *Pseudomonas radiculicola*, grown in nitrogen-free media and dried on cotton immersed in the culture. These cultures are sent out by the U. S. Department of Agriculture together with packages of nutrient salts to multiply the organism. The mass-culture thus obtained is used to inoculate the seed or the soil. Numerous reports from farmers of all states indicate that this method will prove successful and practicable.

ARTIFICIAL DRYING OF CACAO.

In his article on 'Grenada at the Colonial Exhibition,' in the *West India Committee Circular*, from which extracts are given elsewhere in this issue, Mr. W. G. Freeman makes the following observations on the artificial drying of cacao. Mr. Freeman refers to the cacao drier erected by Mr. Hoadley, which was described in the *Agricultural News*, Vol. IV, p. 174:—

The cacao exhibit, although not extensive, is of great interest, because, like the much larger display of Trinidad, it is indicative of the progress which is being made in agricultural methods in the West Indies. The two samples of peasant-cured, sun-dried cacao represent the old order of things, whilst the new order is represented by the bag of cacao exhibited by the Hon. D. S. deFreitas, from Dougaldston estate. As the label in the court states, this cacao was placed direct from the fermentation boxes into one of the cacao-drying machines manufactured by Messrs. J. Gordon & Co., and completely dried and polished, without breakage, in twenty-four hours. The quality of the product is made evident by the fact that the sample exhibited gained the first prize at the recent Agricultural Show in Grenada. This sample, and that in the Trinidad court, dried in Mr. J. Hoadley's machine, are worthy of the serious consideration of all cacao producers. The cultivator in temperate climes has long been forced to recognize that old methods must be replaced by new if he is determined to hold his own in the struggle for existence. In the tropics, owing to special circumstances, this necessity has not yet been so universally brought home, but here also increasing competition must inevitably result in success falling only to those who by taking advantage of each improvement turn out produce of high and uniform quality, by the most economical and up-to-date methods.



ANTIGUA.

At a meeting of the Agricultural and Commercial Society, held at Antigua on July 7, Dr. Watts read a paper reviewing the position of the cotton industry in the island. The following are extracts from the paper:—

The most profitable instance of cotton growing last season in Antigua was at Bettys Hope estate where 18 acres were planted in cotton and over 20,000 lb. of seed-cotton had been reaped. The lint was sold for 1s. 2d. per lb. and the profits on the 18 acres would probably be between £200 and £300.

Another instance of profitable cultivation was at Piccadilly estate, where 10 acres had been planted and 12 bales of 180 lb. of lint had been marketed. This amount (2,160 lb.) had been sold at 1s. 2d. per lb. and the profits were from 50 to 60 per cent. on the money invested.

There would be 260 bales sent from Antigua this season, against 163 last season, and the price realized had been better. Some failures had occurred but these could generally be traced to either very poor soil or late planting.

It was not necessary to take the sugar lands to plant cotton. There were between 5,000 and 10,000 acres of land in the north, east, and south of the island that were not being used for any important crop and which with proper treatment could be made to yield good crops of cotton. The best cane lands were, in many instances, too stiff for cotton.

All old cotton should be destroyed by the beginning of June in each year to avoid, as far as possible, carrying over diseases from crop to crop.

It was all-important that good seed should be sown. There was no doubt that they had obtained 20 to 30 per cent. better prices for their cotton owing to the Rivers' improved seed obtained for them last year. The action on the part of Sir Daniel Morris in obtaining all the seed possible of Rivers' improved variety last year was a splendid stroke of business, which placed the planters in the West Indies on a level with the planters in the Sea Islands, as far as seed was concerned, up to last year.

It was important that a good stock of insecticide should be on hand at the time when the seed was sown. The action of insects was too rapid to think of this being left until an attack was made. Paris green was needed for the caterpillars, and sulphur and lime in equal parts gave a sure remedy for the leaf-blister mite. A moderate amount of pen manure should be applied. If the seed were returned to the soil very little of the fertility would be removed by the cotton crop. Cotton seed was excellent as part of a stock ration because it contained a large supply of nitrogen, a constituent deficient in both cane-tops and molasses. The best time to sow cotton seed was as soon as the rainy season set in, say, about July.

RATOONING COTTON.

Readers of the *Agricultural News* will be aware that the Imperial Department of Agriculture strongly deprecates the ratooning of Sea Island cotton in the West Indies. The reasons for the advocacy of annual sowings in fresh soil were briefly stated in a recent editorial (p. 113). With the view of further urging the adoption of the latter practice, it is proposed to publish a series of articles dealing with the reasons why the ratooning of Sea Island cotton is undesirable.

In the following article the subject is discussed, from several points of view, by Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations:—

Before discussing the question of ratooning cotton, it will be best to define what we are to understand by ratooning. In cane planting the word implies the growth of young shoots from old, cut-back plants; with the idea of raising another crop from the old stools. In cotton plants we use the word in a rather different sense. If we were to use the word as it is used in cane cultivation, we should have to speak of the young growth from the cut-back plants in February and March as ratoon plants, but this is not what is meant in the case of cotton. Our definition, in this case, is—'continuing the growth of the old plants after the closing of the dry season, and after seed has been sown for the new crop.'

The reasons why ratooning cotton is not desirable are as follows:—

- (a) Because of its effect on the quality of the lint, and thus on the position it occupies in the market.
- (b) Because of its influence in spreading diseases.
- (c) Because it is more economical to grow another crop after cotton has been grown for one year.

THE EFFECT OF RATOONING ON THE POSITION OF WEST INDIAN COTTON IN THE MARKET.

The ratooning of cotton is of great interest in the present stage of the industry. We have just established a market and have already attained a good position. If a planter wishes to obtain a name for his cotton, or keep the one he has already gained, he must avoid ratoon cotton. The first crop may be of excellent quality, but afterwards it deteriorates in every respect: the lustre disappears, the fibres become coarse, and the staple becomes very much shortened. It will be impossible to use this for the same high-class work as the first crop cotton. The price obtained for ratoon cotton this year ought to be sufficient to guard any planter against it: when ordinary Barbados cotton was selling at 33c. per lb., ratoon cotton fetched only 18c.

Great care must be exercised if we are to keep the

position we have attained. Unless the West Indies can continue to produce a uniform quality, of a high standard, our present position in the market cannot be maintained.

Some of the planters are very careless because they have obtained the same price as their more careful neighbours, but there is little doubt that if a spinner has paid a good price for cotton which has turned out to be of an inferior quality, he will be on his guard when he sees the same mark again offered for sale.

Not only is it in the interest of the planter, personally, to be careful about the quality of the cotton he ships, but it is important, also, in the interest of the cotton industry in the West Indies that no cotton should be sent from the islands except the finest quality possible.

THE INFLUENCE OF RATOONING IN ESTABLISHING AND SPREADING DISEASE.

A change takes place in the character of the plant during its growth. When young and healthy, it is in a position to resist disease to a certain extent, but as it gets older, and especially during the dry season, it loses much of its vigour, and is thus unable to ward off disease. Insect pests and fungoid diseases become firmly established. These plants become a source of infection to the young plants which have just commenced their growth, and at the time the latter come to maturity, the diseases are more firmly established than in the previous season.

A break ought to be made between the old and new crops and the longer time that can be placed between the two, the less chance there will be of the one proving to be a source of infection to the other.

ROTATION OF CROPS MORE ECONOMICAL THAN RATOONING.

It is more economical to grow another crop after cotton has been in the soil for a year. To produce a fine quality of lint, we are well aware that the soil requires to be reduced to a very fine tilth. A loose open soil gives the best results.

After the plants have been growing, and the soil has been lying almost undisturbed for a year, it is getting very hard and firm, and unless the plants are removed it is impossible to change this character. To continue the growth of the plants in this firm soil would be greatly detrimental to the quality of the lint produced. The firm setting of the soil appears to be one of the most important factors which influence the quality of cotton, and probably a factor which is responsible to a great extent for the deterioration of the quality after the first picking.

Again, the cotton plant is one which has a number of its roots passing to the deepest layers of the soil; some of its roots are also in the upper layers, but there is no comparison between the roots of the sugar-cane and the roots of the cotton in these upper layers of the soil, so that while cotton is growing the upper layers are resting to a certain extent. To continue the growth of the cotton plant will be to continue to drain the same land of food which has already given up almost all that has been rendered available, and it would be a far better policy to make a change and put in some plant, such as the sugar-cane, which is a more extensive surface feeder. This method of working has given excellent results.

The subject of ratooning cotton in St. Kitt's-Nevis is thus referred to by Mr. F. R. Shepherd, Agricultural Superintendent, in a recent letter to the Imperial Commissioner of Agriculture:—

With reference to the conditions existing in St. Kitt's as to ratoon cotton, I am able to inform you that all the old cotton has now been cleared off the land and the cotton for the coming season is being freely planted.

In Nevis some of the old cotton still remains, but the owners have been warned as to the mistake they are making in not destroying it, and I feel sure that soon there will be none left.

In this presidency it is very important for the success of the industry that your advice should be strictly carried out, as the leaf-blister mite attacks the old cotton to such an extent that remedial treatment is useless.

HAYTI.

The following reference to the prospects of cotton cultivation is made in the *Consular Report* on Hayti for 1904:—

Some 3,017,014 lb. of cotton were exported in 1904, as against 3,260,271 lb. in 1903, and 2,000,000 lb. in 1902. The gathering of cotton is generally abandoned on coffee rising in price. Most of the cotton was from St. Marc. The best quality is said to be grown at Gonaïves. The cotton was shipped principally to Hamburg and Harve and a little to Liverpool. Some 275,847 lb. of cotton seed, chiefly from Jacmel, were likewise exported. The prices commenced at 30c. per lb. in the month of March, but reached 50c. per lb. (owing to high premium on gold) in May and June. The price dropped to 30c. in August 1904.

Owing to the higher prices obtained for cotton during 1904, planters were encouraged to cultivate this product on a larger scale, but the great disturbance in Haytian finances caused a rapid increase of all expenses, and thus they were compelled to reduce their planting. This country is suited to cotton growing, and but little care or cultivation is required, the expenses being in the gathering, ginning, and baling. The staple is of fairly good quality.

Exporters of cotton from Hayti are continually being blamed for the manner in which they pack and clean their merchandise. The cotton is generally badly gathered, and it often appears to be picked too late, a defect, which, taken together with the humidity and the sun having given it a dark colour, causes its marketable value to be diminished. Owing to the somewhat woolly nature of Haytian cotton it has been suggested that it should be exported to Europe in denser bales than those in use.

The quality of cotton grown resembles the fibres of Brazil (Céara, Pernambuco). I have been informed that Sea Island cotton has been introduced, with a chance of its increasing.

EGYPTIAN COTTON SEED FOR SALE.

With reference to the announcement in the *Agricultural News* (Vol. IV, p. 120) to the effect that the Imperial Commissioner of Agriculture had obtained a supply of seed of the best varieties (Jannovitch, Abbassi, and MitAfifi) of cotton from Egypt, it may be mentioned that there is still a small quantity for disposal. The following quantities are on hand: 28 lb. of Jannovitch, 44 lb. of Abbassi, and 8 lb. of MitAfifi. Those desirous of obtaining some of this seed for planting in the West Indies should communicate with the Imperial Commissioner of Agriculture (Head Office, Barbados) without delay.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The aims and objects of the Arbor Day movement are discussed in the editorial of this issue. Hints are also given as to the preparations and arrangements necessary for the systematic planting of trees in this connexion.

On p. 227 the position of the sugar industry in Java is reviewed. On the same page will be found a description of the Grenada exhibit at the Colonial and Indian Exhibition.

A brief review of the cotton industry of Antigua appears on p. 230. This is followed by the first of a series of articles on the reasons for avoiding the ratooning of Sea Island cotton in the West Indies.

The insect notes in this issue deal with (1) barrel sprayers, their construction and uses, and (2) with the predacious habits of the wild bees in relation to the cotton worm. On p. 237 will be found a note on the prevention of tropical diseases by the extermination of mosquitos.

Important experiments have been carried out in Ceylon in the use of leguminous plants for green dressing. In view of the importance of this subject in the West Indies a short review of these experiments is published (p. 235).

The note on p. 238 on the use of home-grown food-stuffs for stock contains useful information in regard to the value of sweet potatoes, cassava, and cane syrup, which the writer has found to give good results in feeding horses and mules.

Consumption of Cacao.

Dun's Review, discussing the rapid development of the cacao trade, states that the importation of cacao into the United States has grown from 9,000,000 lb. in 1883 to 24,000,000 lb. in 1893, and 63,000,000 lb. in 1903. This indicates that the consumption of cacao is greatly increasing.

While the importation of manufactured cacao has fallen, the amount of capital employed in cacao and chocolate manufacturing establishments has increased from \$530,500 in 1880 to \$6,890,732 in 1900.

Of the total imports (51,000,000 lb.), nearly 30 per cent. was from the West Indies.

Cultivation of Oranges in Antigua.

At a meeting recently held in the Liberta district of Antigua, Mr. A. J. Jordan, Curator of the Botanic Station, read a paper on the 'Cultivation of oranges and other citrus fruits.'

Mr. Jordan mentioned that he had been much impressed by the vigour and fruitfulness of the orange trees in the district. If the trees could do so well without cultivation during such an unfavourable season as the present, good results might reasonably be expected, in an average season, if the trees were properly cultivated.

The first essential to success would be the introduction of budding. One peasant proprietor had gone to the trouble of obtaining seed from Dominica: but seed selection was not sufficient owing to the plants not 'coming true.'

Mr. Jordan then gave a practical demonstration of the operations connected with budding, and exhibited plants budded by boys at the Olveston School, Montserrat.

West Indian Plants at the Colonial Exhibition.

It would appear from the various reports on the Colonial and Indian Exhibition that a special feature of interest in the West Indian court is the collection of living economic and other plants. The majority of the plants, which were sent over in tubs, are still fresh and green.

A large collection of plants was sent from the Public Gardens, Jamaica. Among the plants may be mentioned tree ferns, a young cocoa-nut tree, Liberian and Arabian coffee trees, camphor, cacao, Avocado pears, pimento, etc., etc. The coffee trees are reported to be in specially fine condition; seedling canes are also growing in tubs. Unfortunately, the first shipment arrived during a frosty spell and some of the plants were killed.

There was also sent from Jamaica a fine collection of fruits, flowers, and leaves of economic plants preserved either in formalin or in alcohol and naphthaline. They have been put up in large, striking-looking jars, and make a most attractive exhibit of considerable educational value. Among the specimens are the principal West Indian fruits (mangos, star apples, sour sops, naseberries, custard apples, etc.

Cane Farming at Trinidad.

Attention has been drawn in the *Port-of-Spain Gazette* to a note in the *Agricultural News* of May 23, 1903 (p. 172), that 'nearly 2,000 acres of sugar-cane are now under cultivation by cane farmers in Trinidad.' It is impossible, after the lapse of more than two years, to give the authority for this note, but as it appeared under the head of 'Gleanings' it is probable that it was taken over from a Trinidad publication. No misapprehension could, however, have arisen on the subject as in the *Agricultural News* of November 21, 1903 (p. 370), there were published in full the actual figures given by Professor Carmody in his paper on 'The Industrial Resources of Trinidad' in *Industrial Trinidad* (p. 604). Further, the returns of the Trinidad cane farmers' crop for seven years (1898-1904) were published in the *Agricultural News* of October 8, 1904 (p. 322). The most recent information in regard to this subject, contained in a paper read at the last Agricultural Conference by Professor Carmody, was published in the *West Indian Bulletin* (Vol. VI, pp. 3-7). It will therefore be seen that the fullest information has been placed in the hands of the readers of the publications of the Imperial Department of Agriculture, with regard to the position of cane farming at Trinidad.

Rats and Plague.

The Government of Jamaica has been notified by the British Consul at Panama of the presence of bubonic plague in that city. The nearness of Jamaica to Colon and the frequency of communication have rendered it desirable that every effort should be made to prevent the conveyance of this dreaded disease into Jamaica. With this object the Health Officer at Kingston urges a crusade against rats and mice.

It is now well known that bubonic plague is spread by the instrumentality of rats and mice. Dr. Ogilvie therefore urges (1) the wholesale destruction of rats and mice, and (2) their exclusion from dwellings, warehouses, etc. The latter object can be gained by cementing earthen basements which have been burrowed by rats, packing loose-fitting holes through which pipes pass, refitting doorways, and in other ways.

With regard to the destruction of rats, trapping and poisoning (with arsenic or phosphorous) are recommended.

It would appear that this would be an excellent opportunity for a trial of rat virus on a large scale. The experiments so far carried out in the West Indies would seem to indicate that houses can be cleared of these vermine to a considerable extent by its use.

Elsewhere in this issue is published a statement of the results of successful trials with rat virus at Antigua. Arrangements are being made by Dr. Watts for simultaneous attacks in various parts of St. John's. The necessity for such action has been proved by the discovery that, in some cases, the rats migrated to adjoining buildings where no virus had been used. Reports of the experiments with the virus in other islands will follow.

The Colonial and Indian Exhibition.

The prominence which has been given in the *Agricultural News* to notes in reference to the Colonial and Indian Exhibition has, no doubt, served to indicate the importance which the Imperial Department of Agriculture attaches to the adequate representation of the West Indies at this important exhibition. Through the efforts of the West India Committee and the local committees, excellent exhibits have been forwarded from several of these islands and have undoubtedly attracted a great deal of attention. The desirability of making known to the consumers at home the capabilities and resources of the West Indies has frequently been impressed upon the readers of the *Agricultural News*.

The interesting series of descriptive articles on the several exhibits by Mr. W. G. Freeman in the *West India Committee Circular* are to be followed, after the awards of the judges have been announced, by more critical notes on the preparation of the articles in the exhibits. Descriptions of the Barbados and Trinidad exhibits have already been published, while that of Grenada is described in this issue (see p. 227).

A further note urging the appointment of permanent exhibition committees in the West Indies will be found on p. 239, where mention is made of the action that has been taken by the Grenada Agricultural and Commercial Society to give effect to this suggestion.

Distribution of Economic Plants in St. Vincent.

A very satisfactory feature of the work carried on at the Botanic Station, St. Vincent, as shown in the report for the year ended March 31 last (issued to-day), is in connexion with the distribution of economic plants. The Agricultural Superintendent reports that the number of economic plants distributed, in addition to cane plants, sisal bulbets, etc., was 26,256, which far exceeds the number distributed in any previous year. Of this total no fewer than 22,204 were cacao plants.

This increasing demand for economic plants is an encouraging indication that large areas are being planted in cacao and other permanent crops. As was mentioned in the last issue of the *Agricultural News* (p. 220) the exports of cured cacao from St. Vincent have steadily increased since 1900. They reached 742 bags during last year. It is reasonable to expect that, should no further catastrophe be experienced, the exports will soon exceed the record before the hurricane, when upwards of 1,500 bags were exported. It would therefore appear that strenuous efforts are being made to replace this industry in the satisfactory position which it formerly occupied.

It may be mentioned that 15,424 economic plants were distributed in connexion with the Land Settlement Scheme, of which cacao was responsible for 15,060. It is estimated that 32,554 economic plants were growing on allotments at the end of the year 1904-5, 30,161 representing cacao; 2,690 are bearing trees, and over 300 young trees should come into bearing next year.



INSECT NOTES.

Barrel Sprayers.

In the *Agricultural News* (Vol. IV, p. 186) a brief description was given of the auto-spray. The present article deals with machines of larger capacity which are adapted for the work of spraying large trees, whereas the auto-spray is more suitable for work in garden or nursery. Barrel sprayers vary in size, and are of many makes, bearing various trade names. The figures shown on this page represent the 'Fruitall' (fig. 15), and the 'Gem' (fig. 16).

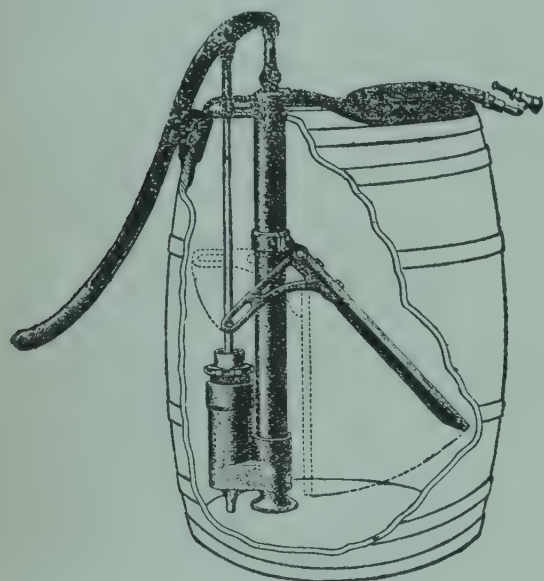


FIG. 15. 'FRUITALL' SPRAYER SHOWING WORKING PARTS.

Fig. 15 shows the construction of the 'Fruitall' sprayer. An ordinary cask of 45 or 50 gallons' capacity serves as a tank, into which the pump is fastened. The pump is a suction and force pump and is provided with agitators or stirrers which move in conjunction with the pump handle, and serve to keep the spray mixture well stirred.

It is important to have an efficient agitator in all spray-

ing operations, but especially so when using arsenical poisons in combating leaf-eating insects, and when using Bordeaux mixture in combating fungoid diseases.

The pump shown in fig. 15 also has an air chamber which provides for a steady stream from the discharge nozzle.

Fig. 16 shows the 'Gem' pump in use, operated by one man.

The 'Fruitall,' 'Pomona,' and many other barrel pumps are strong enough for two lines of discharge hose to be used; thus three labourers are employed with each spray outfit, one to pump and one for each line of hose and nozzle. The barrel may be mounted on wheels as shown in fig. 16, or it may be carried by means of poles in places where the ground is too rough to allow of the use of wheels. In addition to the pump and tank, the other requisites are one or two leads of hose of suitable



FIG. 16. 'GEM' SPRAYING OUTFIT IN USE.

length, and for each of these a nozzle extension and nozzles. The nozzle extension may be a piece of galvanized-iron pipe with screw threads on either end. There are two kinds of nozzles that may be used. The Vermorel nozzle, which produces a very fine spray should be used for spraying with arsenicals, such as Paris green and arsenate of lead, and with the contact insecticides, such as kerosene emulsion, whale oil soap mixture, and rosin mixtures. The Bordeaux nozzle is to be used in spraying with Bordeaux mixture, or when it is desired to throw a stream some distance to get at foliage that would be out of the reach of the Vermorel nozzle. The cost of a barrel spray outfit, complete, would be from \$20 upwards.

Wild Bees and the Cotton Worm.

The following letter, signed by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, which appeared in the *Barbados Advocate* of July 14, in reference to an editorial suggestion in that paper to the effect that planters should ascertain whether the cotton worm might not be successfully kept in check by the wild bees without the use of Paris green, is published for general information:—

I notice that in yesterday's issue of the *Advocate* you publish an interview of a *Daily Mail* representative with Mr. George Compere, in which he gives some of his experiences in hunting down the natural enemies of certain insect pests.

In another place in the same issue under the heading 'The Parasite Hunter,' you draw attention to the habit of the wild bees of feeding on the cotton worm. I may say that this predaceous habit of the species of wasps, called locally 'wild bees' and 'cow bees,' has frequently been mentioned in the publications of the Imperial Department of Agriculture during the past two years, and many of the planters recognize them as natural enemies of the cotton worm. I am of opinion, however, that ample proof has been furnished during the past two years that the natural enemies of the cotton worm cannot in the least be depended upon to control this pest, and that any planter who neglects to use some artificial check stands a very good chance of losing his cotton crop. It is true that, in a few instances, cotton has been grown without the use of Paris green, but it has not yet been proved that the natural enemies of the cotton worm are to be credited with the result. Any planter who delays the application of Paris green, until he has seen how far the natural enemies will be able to control the cotton worm, will probably find, by the time the natural enemies have been proved unable to hold the pest in check, that the worms have developed so far that even the application of Paris green will not save his cotton.

Prevention of Cruelty to Animals. At the recent Agricultural Show held at Hope, Jamaica, under the auspices of the Port Royal Mountains Agricultural Society, prizes were offered by the local society for the protection of animals as follows: (1) the best bus (i.e. cab) and horse; (2) the best pad mule; (3) the best pad donkey; (4) the best-fitting and most suitable harness. Considerable interest was taken in these events, and the exhibits were decidedly creditable. Competitions of this nature should be of considerable value in furthering the objects of and arousing interest in societies for the protection of animals.

GREEN MANURES IN CEYLON.

Since the establishment of the Experiment Station at Peradeniya, Ceylon, in 1902, a considerable amount of work has been done in connexion with green manuring, a detailed account of which is presented in the report for 1904. The following is a brief summary of the more important results:—

Definite results were obtained during the year with tea, cacao, rubber, cocoa-nuts, and paddy, and it is expected that the cultivation of green manures will play an important part in the near future.

Among the advantages of green manuring may be mentioned: the prevention of loss of soluble plant food which takes place when tropical soils are left exposed, particularly in newly opened clearings; the provision of a large quantity of organic matter which is markedly deficient in most Ceylon soils; the reduction of the amount of wash; the protection of the soil from the sun, regulating the moisture conditions of the soil, so that bacterial activity, which is responsible for the liberation of much plant food, is more uniform throughout the year. If leguminous plants are used, there is the additional advantage that large quantities of atmospheric nitrogen are fixed by the plant and ultimately added to the soil. It must be remembered that nitrogen is one of the most important, and at the same time the most costly, of the essential ingredients of plant food.

A wide variety of plants has been under experiment; among them species of the following genera: *Crotalaria*, *Albizia*, *Phaseolus*, *Vigna*, together with the pigeon pea and the ground nut.

Preference for arborescent forms, such as species of *Erythrina* and *Albizia* is shown in some cases on account of the more permanent nature of the shade and the greater mechanical effect of the tree roots. But this system has its disadvantages: in any case if trees are used for shade, as in the case of cacao, they should be kept under control by frequent lopping.

An important advantage accruing from green manuring is that, if the green manure is sown in proper quantities on clean land at the right season, weeding becomes almost negligible within two or three months from sowing. In some instances in these experiments the saving in weeding, apart from other questions, more than paid for the cost of the original seed, and uprooting and burying the green manure. In the case of new clearings, the best cover within the shortest time was obtained by cultivating herbaceous forms such as those mentioned. Considering the heavy cost incurred by weeding new clearings, it is impossible to exaggerate the necessity of seriously considering this question. Species should be selected that do not flower frequently and, if possible, those which have the power of absorbing nitrogen from the air.

The success of green manures, especially the herbaceous forms, depends, to a large extent, on the weather following the sowing of the seeds. The seeds should be sown when rain may be expected.

Brief reference was made in a former issue of the *Agricultural News* (Vol. III, p. 424) to the use of ground nuts in Ceylon for green manuring. The experiments therein referred to have been continued and are thus reported on:—

This plant grows rapidly, has a short life-history, and is one of those which has the power of absorbing atmospheric nitrogen. It is therefore suitable as a green manure, and the best variety for this purpose is found in the Pondicherry.

For purposes of green manure this product can be grown under most cultivations up to 2,500 feet, but least of all in old tea. I mention the question of the ground nut for green manure to draw attention to the fact that it absorbs atmospheric nitrogen which compensates to some degree for that removed by the crop, and to suggest that any exhaustion following repeated crops of this product can be partially counterbalanced by its cultivation in this form. The Pondicherry variety grown in a young clearing will produce about 4 tons of fresh, green material per acre per year. This material—roots, leaves, and stems—contains 0.914 per cent. of nitrogen.

In our experiments the Pondicherry variety was selected because it produces only a small crop of nuts and a large amount of leaf and thin stems. It has a trailing habit, and usually dies down every four to six months, and if planted between every alternate line of tea may yield about 4,000 lb., or more, of green material per acre per year. In a young clearing as much as 9,000 lb. of material fit to be buried was obtained within a year. The fresh material contains 0.914 per cent. of nitrogen.

GRENADA BOTANIC STATION.

Mr. R. D. Anstead, B.A., Agricultural Superintendent at Grenada, has forwarded the following notes on the progress made by plants and seeds sent from time to time by the Imperial Commissioner of Agriculture:—

The improved Guinea corn did not germinate at all, but the ear of improved Indian corn germinated well, and the plants are very large, clean, and fresh looking. A plot has been formed of them which is now blossoming freely and gives every promise of a good yield.

The Tortola pigeon peas are also doing very well, and have made a plot of large, bushy, compact shrubs, which will soon be in flower.

Telfairia pedata, and *Musa livingstoneana* both germinated well; the former has been planted out in the gardens, and I am trying to find a suitable situation for the latter to be tried, as elevations in the gardens are all too low for it.

Almost every seed of *Paullinia barbadensis* germinated, and seedlings have this week been planted out in the gardens against trellis work.

The *Canavalia ensiformis* has been sown as a green dressing, and all the seeds have germinated; while seedlings of *Ipomoea Bona-Nox* and *I. ventricosa* have been planted out in the gardens. The former is a common wild plant here.

CASTILLOA AS SHADE FOR CACAO.

In continuation of the article on p. 219 of the *Agricultural News* on the use of *Castilloa* as shade for cacao, the following extract from a letter from Captain M. Short, of Richmond, Tobago, to the Imperial Commissioner of Agriculture, dated June 11, 1905, is published for general information:—

I am glad that you consider the rubber trees here very healthy and that so far they do not appear to have any injurious effect where shading cacao trees. As I keep accurate returns of the yield of each cacao piece throughout the year, and also check yearly the number of bearing trees in each piece, I can tell to within a few pounds the annual yield of each piece per acre, so that I shall be able to tell if the yield of cacao under rubber falls off as both grow older.



GLEANINGS.

It may be mentioned that the Symington Fruit Syndicate has finally decided to cease all operations in Trinidad.

A private meeting of the Tobago Planters' Association was held on July 5, when rules were drawn up for the management of the affairs of the Association.

According to the *Port-of-Spain Gazette*, a trial shipment of Sea Island cotton, grown by Mr. C. W. Wyatt at Princes' Town, Trinidad, has been pronounced 'very good' and fetched 12*d.* and 14*d.* per lb.

It would appear that the peasants at Montserrat are taking an increasing interest in the matter of stock. In the last half-year about £1,000 in cattle went off the island and £400 in small stock.

The shipment of molasses from Barbados for the present crop, up to July 13, was 33,678 puncheons, as compared with 38,841 puncheons at the same time last year. The crop is now practically closed. (Messrs. James A. Lynch & Co.'s 'Market Report,' Barbados, July 15.)

In reference to the note in the *Agricultural News* (Vol. IV, p. 117) describing the 'thread' disease of cacao and mentioning its appearance in St. Lucia, Trinidad, and British Guiana, it may be of interest to state that Dr. Watts reports that the disease has, so far, not been found in Dominica.

Messrs. Henry W. Frost & Co.'s report on the Sea Islands market, dated Charleston, July 1, 1905, states:— 'The crop reports are generally favourable, and the outlook at present is promising. We have had beneficial rains, which were needed in some sections, and the fields have been well worked and are now free of grass.'

Mr. W. M. Cunningham, who, as mentioned in the last issue of the *Agricultural News*, has been appointed Curator of the Botanic Station in the Bahamas, was, on leaving Jamaica, the recipient of farewell addresses from the agricultural students, and also the pupil apprentices, at the Hope Gardens. Mr. Cunningham's efforts as an instructor have been much appreciated.

By last mail 41 bales of cotton were shipped to the British Cotton-growing Association from Antigua. It may be mentioned that the shipment contained 9 bales of stained cotton: it was requested that these should be placed on the market as 'stained' in order that the reputation of Antigua cotton might not be damaged by the shipment of such cotton.

A meeting of the Antigua Agricultural and Commercial Society on July 7 was attended by a representative of Messrs. Fowler & Sons, steam plough manufacturers. In response to an inquiry, this gentleman said that the problem of ploughing in trash had never before been presented to his firm, but that they were making a specially designed plough for that purpose which would be tried in Antigua.

Monsieur Th. Dufau, a distinguished French scientist interested in sugar matters, who attended the West Indian Agricultural Conference at Barbados in 1902, and now Director of the Société Générale des Sucreries et de la Raffinerie d'Égypte, is contributing a series of articles on sugar subjects to the Paris journals. His comparisons of the relative prospects of the beet and cane sugar industries are likely to be of special value.

Upon the suggestion of the Agricultural Superintendent, the Government of St. Vincent has placed a sum on the estimates to provide for the destruction of the mongoose. The sum of 2*d.* is paid at the Police Station for each female, and 1*d.* for each male, and several hundreds have been captured to date. This action has become necessary on account of the fact that several small industries were being kept back owing to the ravages of the mongoose.

In reference to the scheme for the purchase of farmers' canes in Trinidad, outlined in the *Agricultural News* (Vol. IV, pp. 194-5), the *Port-of-Spain Gazette* says: 'All the factory owners, i.e., estate owners who grind their own and farmers' canes, have not, it is true, agreed, but we think the extent of the agreement arrived at is highly creditable to all concerned and will . . . secure the adherence to its terms, of all factory owners in the colony.'

Messrs. Elders & Fyffes, Ltd., state that the total importation of bananas into the United Kingdom, for the six months to June 30, amounted to 2,395,351 bunches, as compared with 1,416,873 bunches during the same period in 1904, showing an increase of 978,478 bunches. Of this increase Jamaica and Costa Rica bananas accounted for 681,792 bunches, the total of these varieties for the respective half-years being 662,142 and 1,343,934 bunches. (*West India Committee Circular.*)

The attendance at the Colonial and Indian Exhibition since the opening day has been 359,984. The West India Committee announces that there is a little space remaining for exhibits genuinely relating to the West Indies, which will be placed at the disposal of firms. Brisk business has been done at the West Indian produce stall, organized by the Committee: it was found necessary to cable to the West Indies for fresh supplies of lace bark articles, bitter wood cups, arrowroot, honey, lime juice, etc.

Anthrax made its appearance at Dougaldston, Grenada, in April last. Energetic measures were taken by the owner, the Hon. D. S. deFreitas, the Agricultural and Commercial Society, and the Government, to stamp out the disease. A useful and practical paper by Mr. deFreitas has been published in the *Proceedings* of the Agricultural and Commercial Society, drawing attention to the necessity for disinfecting all pastures, buildings, etc., where cases have occurred, and for destroying affected carcasses.

RAT VIRUS AT ANTIGUA.

At a meeting of the Antigua Agricultural and Commercial Society, held on July 7, the Hon. Dr. Watts, C.M.G., gave a short account of some successful trials with the Liverpool rat virus:—

Those who had made the trials had reported that the rodents had disappeared after the virus had been used, and no more trouble had been caused for one or two weeks after. It was quite easy to understand why the good results were not of a more permanent nature. If one merchant cleared his store of rats and his neighbour did not, the rats from the adjoining building would soon occupy the vacant lot. He had been told that rats live in colonies and that two colonies might be found in one building, each animal keeping to its own colony. It was proposed that a co-operative effort should be made to secure simultaneous attacks in various parts of the city. In order that this might be done the Agricultural Department was prepared to undertake the supervision of the importation of the virus if a sufficient number were ready to make the trial. The trial would be made after the arrival of the Royal Mail steamer from England. Four trials would be made and the total cost would be 4s. for each subscriber.

Mr. Bryson said they were greatly indebted to Sir Daniel Morris, in the first instance, and to Dr. Watts for bringing this excellent cure of the rat pest to their notice. He had tried it and found it quite a success. Mr. Cranstoun and Mr. J. Roden also spoke of their success with the virus. In answer to Mr. Harper, Dr. Watts said that the virus must be imported on ice, and would not keep, so that it was not probable that any merchant would care to venture on an importation at the present stage. The virus could be obtained from Liverpool at 1s. 8d. per tube.

SISAL HEMP IN THE UNITED STATES.

The *Consular Report* on the trade of New Orleans for 1904 has the following reference to the imports and use of sisal hemp:—

Sisal grass, a substitute for hemp, is grown in Yucatan, and comes here from Mexican ports. It has become one of the chief materials used in the United States for making rope. It is an article of trade largely monopolized by New Orleans, from which port it is forwarded to Chicago and other western manufacturing centres.

The total imports of sisal grass at New Orleans have increased from 1,466 tons, of the value of £37,281, in 1900, to 29,652 tons, valued at £760,247, in 1904.

STOCK WANTED FOR ST. KITT'S.

Inquiries have been received from St. Kitt's for the following animals:—

1. Young Anglo-Nubian or Toffenberg ram goats about a year old.

2. Young rams of hairy or woolless breed of sheep from Barbados.

3. Trios of Belgian hares not less than six months old.

Persons having any of the above for sale should communicate, stating full particulars as to age, pedigree, price, etc., with:—

Stockmaster, Imperial Department of Agriculture,
Barbados.

PREVENTION OF TROPICAL DISEASES.

The following extracts from the annual Medical Report on the sanitary condition of the presidency of St. Kitt's-Nevis, in reference to the prevention of tropical diseases by the extermination of mosquitos, are worthy of careful consideration:—

The most common type of malarial fever prevalent here is the remittent, which from the free tide of emigration and immigration, has now become almost endemic. As far as medical science can tell us at present, the anopheles mosquito is the sole conveyor of infection; other sources, if any, are unknown, thus it is usually most common in the vicinity of stagnant water, which are the breeding pools of these special mosquitos. The connexion between malarial disease, mosquitos, and stagnant water being established, precaution lies in protecting ourselves from the bites of mosquitos, and in getting rid of stagnant puddles. This latter is within the range of possibility in a town where concerted action is taken against them, and sufficient means can be employed in draining and filling up puddles, cleaning ponds, collecting and destroying old tins, bottles, hollowed stumps of trees, and all such places that contain stagnant water.

Filariasis is extremely prevalent in this presidency, and I fear very much on the increase; 32.8 per cent. of the inhabitants were calculated to be subjected to it in the year 1901; it is commonly associated with elephantiasis. It is another disease spread from man to man by means of a special mosquito, and forcibly emphasizes the necessity of trying to rid ourselves of these very unpleasant attendants. It is reasonable to expect and hope that, as the subject gets more widely known, these diseases may become very much less common.

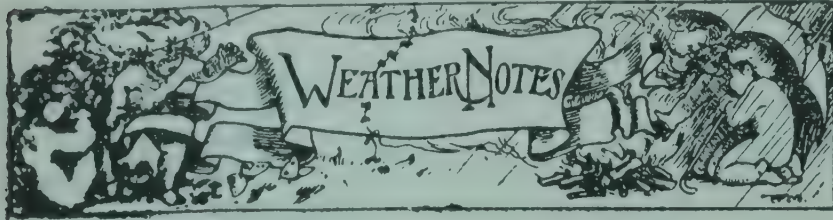
Improper and insufficient feeding of infants greatly helps to increase our mortality lists, and some efforts should be made to stem this tide of ignorance and obstinacy by offering instruction in hygiene and the elements of tropical sanitation to the young in our schools as a first step. A good beginning, worthy of imitation, has been made in Antigua by the delivery of a series of lectures on tropical hygiene to the teachers in elementary schools.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture will embark for Jamaica in the R.M.S. 'Orinoco' on Monday next, July 31.

The Hon. Francis Watts, C.M.G., has been on a visit to Nevis and St. Kitt's with the view of affording information and encouraging the extension of the cotton industry. Dr. Watts was invited to attend a meeting of the Nevis Agricultural Society on the 20th. instant, and afterwards had arranged to proceed to St. Kitt's. It is probable that at all the three islands in the presidency, viz., St. Kitt's, Nevis, and Anguilla, a much larger area will be placed under cotton during the season 1905-6.

Mr. George Branch, Agricultural Instructor at Dominica, has been appointed Agricultural Instructor in the colony of Grenada. Mr. Branch arrived in Grenada in S. S. 'Caribbee' on July 22.



RAINFALL RETURNS.

Antigua.

A report has been received from Mr. A. J. Jordan, the Curator of the Botanic Station at Antigua, on the effect of the recent drought on the station, of which the following is a brief summary:—

The rainfall returns show that the rainfall for the year ended March 31 last was only 32·94 inches. This was but slightly over half the previous year's rainfall and 20·03 inches below the average for the last five years. The rainfall for the period November 1, 1904, to March 31, 1905, was 12·25 inches, as compared with the average for the same period over five years of 18·76 inches.

It would appear that the most fatal period occurred after the showers in May last when the trees started into full growth. The exhaustion thus caused resulted in many of the more advanced trees dying back or drying completely.

'The prolonged period of dry weather is having a marked effect upon the specimen plants at the Botanic Station. The result has been a struggle between the trees and shrubs in which the strong-rooted trees have demonstrated their ability to exist at the expense of their weaker neighbours.'

As the result many ornamental plants at the station have been lost. It may also be mentioned that the trees planted along the public roads, in connexion with the Arbor Day celebrations of the past three years, have died.

During the last month, however, the anxiety has been partially relieved by showers. At the station 2·20 inches fell from July 1 to 11.

British Guiana.

In his Annual Report the Government Botanist of British Guiana makes the following observations on the rainfall at the Botanic Gardens during the year 1904-5:—

The total rainfall for the year at the Botanic Gardens was 85·85 inches, which is 18·68 inches below that of last year, and 7·09 inches below the average for the last twenty-six years.

The amount of rain recorded for the month of January at the Botanic Gardens was 10·56 inches. February was unusually dry with only 2·63 inches, but March and April were exceptionally wet, with a rainfall exceeding 12 inches for each month. The rainfall during the normally wet months of May, June, and July, which constitute the longer rainy season of the year, was much below the average.

With August a long period of dry weather set in which lasted until nearly the end of the third week in December. Not one inch of rain fell on any one day during the months of August, October, and November: in September 2·72 inches were recorded. On December 20, this long period of very dry weather came to an end and was followed by ten days' heavy down-pour which was fairly universal throughout the colony. During this period 11·90 inches fell in one week at the Botanic Gardens.

HOME-GROWN FOOD-STUFFS FOR STOCK.

The *Experiment Station Record* (January 1905) contains the following review of a paper on 'Feeding Horses and Mules on home-grown Food-stuffs' by C. M. Conner in the *Florida Station Bulletin*, 72, pp. 115-26. The food-stuffs referred to in this paper being sweet potatoes, cassava, and cane syrup, the results are of particular interest to stock-owners in the West Indies:—

The value of sweet potatoes, cassava, and of cane syrup as a partial substitute for corn in a ration for horses and mules was studied.

In the test with sweet potatoes two pairs of horses and two of mules, doing hard work, were used, one animal of each pair being fed corn, hay, and sweet potatoes in about the proportion of 6 lb. of corn, 17 lb. of hay, and 15 lb. of sweet potatoes per 1,000 lb. live weight, the other animal in each case receiving corn and hay only in about the proportion of 10 lb. of corn and 15 lb. of hay per 1,000 lb. After six weeks the rations were reversed. The hay used was beggar weed of good quality. There was little variation in the weight of the animals, except that in two cases there was some increase when sweet potatoes were fed. In general, the sweet potato ration was the cheaper.

'The most important fact brought out in this experiment is that sweet potatoes may be substituted for at least one-half of the corn ration, this substitution being at the rate of 3 lb. of sweet potatoes for 1 lb. of corn. This being the case, an acre of sweet potatoes, yielding 150 bushels, is equal to a yield of 50 bushels of corn, so far as feeding the work stock is concerned. We do not think that a horse at hard work would do well on an all sweet potato ration from the fact that the bulk would be too great for the capacity of the stomach. . . We have fed one mule for three months on sweet potatoes, cassava, and hay with good results. He was used for light work about the lot, such as hauling feed, bedding, etc.'

Using one pair each of the mules and horses included in the previous test, the value of cassava was studied, one animal of each pair being fed cassava with corn and beggar weed hay for six weeks, and the others corn and hay. The average amount of cassava eaten was irregular and in general smaller than in the case of sweet potatoes. 'The animals maintained their weight throughout the experiment, which may go to show that cassava is more concentrated than the sweet potatoes. . . . Cassava may be used in about the same ratio as sweet potatoes, but is not so palatable to the animal.'

At the close of the cassava test one of the mules was fed for six weeks a ration of corn and low-grade cane syrup, and another the regular corn ration. The amount of hay eaten was not recorded, but the author states that it was about the same as in the previous tests. Small gains were made on both rations. 'Both mules remained in good condition during this experiment in spite of the fact that they were doing hard ploughing throughout the entire time.'

The author states that syrup has been further tested in a preliminary way at the station and 'that it is relished by all farm animals. In feeding the syrup was given at night and morning and a larger corn ration given at noon. . . . Syrup may be fed to the work stock, provided it is mixed with chopped hay or something to give it bulk.' As regards native hay for draft horses and mules, the author notes that considerable prejudice is felt regarding it. In his experience it has been used exclusively for two years and he has never had any cause to regret its use.

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following review, dated June 10, 1905, of the position of West Indian products on the Canadian market:—

SUGAR.

The erratic condition of the beet sugar market on the continent has gradually subsided, and during the present week we have for the first time for months seen an unchanged quotation for a period of three days. Considerable quantities of sugar for refining purposes had been bought, in view of the shortness of supplies in the British West Indies and the firmness of Cuban sellers, and refiners having ample stocks of both muscovado and grey crystals, combined with the slow demand for refined, the market is exceedingly quiet and sales are practically *nil*. Offers of 96° centrifugals at 2 $\frac{7}{8}$ c. were declined on the 9th. inst., but business might have been effected at 2 $\frac{3}{4}$ c. However, a weaker market is anticipated. Refining muscovado is unsaleable, large buyers preferring to hold off during the hot months of summer.

MOLASSES.

The last month has been better for business. Considerable quantities of Barbados and other island supplies have been bought. Prices continue to rule high, and new sales will be difficult to make; the quality this year is considered good. The question of mixing molasses and selling in original packages continues to be discussed, but the difficulty lies in finding a suitable means to check it, and so allow each island's produce to be sold on its merits.

COCOA-NUTS.

The demand has fallen off considerably and all classes of nuts are difficult to place. Trinidad and Jamaica nuts have arrived in fair order and commanded fair average prices; the low prices in New York continue to influence prices here slightly.

FRUIT.

Pine-apples are arriving in fair quantity, and the demand is good. Bananas are higher in price than last season and business is brisk. Limes have been very slow, owing to the cold spring.

SPICES.

Nutmegs: in fair demand. Pimento: very slow. Ginger: a better demand is expected shortly.

BROOM CORN.

A good market is available for all good stock. Heads should be cut with at least 5 to 7 inches of stems, and shipped in 300-lb. bales.

Cacao in Hamburg. Last year's aggregate imports of cacao to Hamburg were the largest on record and reached 573,825 bags, as against 409,435 bags in 1903, and 371,100 bags in 1902. German consumption is stated to have likewise increased in the same proportion, and will, it is thought, probably continue to increase still further in view of the undiminished popularity of cacao as an article of food. The prominent sorts of cacao imported to Hamburg are Guayaquil, African (Accra, Congo, Cameroons, Lagos, St. Thomé, Victoria), Bahia, Samana, Ceylon, and Java, Trinidad, Caracas, Domingo, etc. (*Consular Report on the trade of Hamburg for 1904.*)

PERMANENT EXHIBITION COMMITTEES.

Readers of the *Agricultural News* will be aware of the suggestion of the Secretary of the West India Committee (see p. 57) that permanent exhibition committees should be appointed in all the West India Islands. With the view of bringing this matter again to the notice of Agricultural Societies and similar bodies, the following extract from the *West India Committee Circular* is published:—

Our members will recollect that early in the year we made a suggestion that each island should appoint a *permanent* exhibition committee with a view to securing the representation of the West Indian Colonies on every possible occasion, and to obviate the necessity of appointing a fresh committee to deal with each case as it arises. This suggestion met with the cordial support of the Imperial Department of Agriculture, and we are now glad to be able to announce that the subject was discussed at the last general meeting of the Agricultural and Commercial Society of Grenada, and that it was decided to appoint such a committee in that island. A collection of representative exhibits will gradually be got together, and this will form a nucleus to be drawn upon when required. Grenada is most certainly to be warmly congratulated upon her enterprise in this matter. Already, two further exhibitions are in the air, one being a show of colonial fruit to be held under the auspices of the Royal Horticultural Society at Vincent Square, Westminster, on December 5 and 6 next, and the other, the annual Colonial Products Exhibition to be held in the fine St. George's Hall at Liverpool from January 30 to February 8, 1906. As we have so frequently stated, we believe implicitly in the desirability of our colonies bringing prominently before the British public their mineral, agricultural, and manufacturing resources, of which, unfortunately, too little is known in this country, and the West India Committee, therefore, most readily offer their services with a view to securing their representation on every possible occasion. The expenses of a provincial show, such as the one at Liverpool, would be by no means heavy, and it is our opinion that, with the co-operation of the shipping companies, much might be done for a less sum than £200 collected among all the colonies. Each colony might contribute towards this amount in proportion to its size, and we feel confident that they would afterwards find that money well spent. We shall be glad if our members will bring this matter before the local agricultural and commercial bodies, and favour us with their views as soon as possible, for time in matters of this sort is everything.

DISPOSAL OF DISEASED CACAO HUSKS.

In reference to the note in the *Agricultural News* (Vol. IV, p. 203) on the disposal of diseased cacao husks, Mr. E. A. Agar, of Dominica, writes as follows:—

Some years ago I was losing a considerable proportion of my crop from *Diplodia*, and was recommended by your Department to dig trenches and bury the husks, but this, owing to the stony nature of the soil, was impossible. In the middle of my cacao cultivation are a few small lots of land too poor to grow cacao in which Guinea grass has been planted, and for the last four years I have had the pods carried to these Guinea grass plots to be broken and the husks left in the open. Periodically the heaps of dry husks are spread thinly over the Guinea grass and the result is that my estate is now practically free from *Diplodia*.

MARKET REPORTS.

London,—July 4, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 30, 1905; and 'THE PUBLIC LEDGER,' July 1, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 18/- to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
BEES' WAX—£7 15s. to £8 5s. per cwt.
CACAO—Trinidad, 56/- to 62/- per cwt.; Grenada, 51/- to 54/6 per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.

COTTON—West Indian, medium fine, 5·85d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—5/6 to 6/- per bunch.

ORANGES—No quotations.

PINE-APPLES—Antigua, 10/6 to 15/- per barrel.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, fair bright, 54/- to 57/-; low middling to middling, 45/- to 52/-; good ordinary, 42/- to 44/- per cwt.

HONEY—17/- to 21/6 per cwt.

ISINGLASS—West Indian lump, 2/3 to 2/8; cake, 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £15 5s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/7 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair to good pale, 1/4 to 1/5; pale reddish, 1/2 to 1/3; fair to good red, 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 5s. per ton.

NUTMEGS—60's 1/8; 80's, 10d.; 90's, 8½d.; 100's, 7d. per lb.

PIMENTO—2½d. to 2¾d. per lb.

RUM—Demerara, 1s. 3d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.

SUGAR—Yellow crystals, 18/- per cwt.; Muscovado, 15/9 to 17/6 per cwt.; Molasses, 12/6 to 16/6 per cwt.

SULPHATE OF AMMONIA—£12 12s. 6d. per ton.

Montreal,—June 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—8 hands, \$1·10; Jumbos, \$1·50.

COCOA-NUTS—Jamaica, \$23·00 to \$25·00; Trinidad, \$20·00 to \$22·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1·32 per 100 lb.

MOLASSES—Barbados, 35c.; Antigua, 30c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 19c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5c. to 5½c. per lb.

PINE-APPLES—Cuban, 24's and 30's, \$2·50.

SUGAR—Grey crystals, 96°, \$2·87½ to \$3·00 per 100 lb.

—Muscovados, 89°, \$2·25 to \$2·50 per 100 lb.

—Molasses, 89°, \$2·00 to \$2·25 per 100 lb.

—Barbados, 89°, \$2·10 to \$2·35 per 100 lb.

New York,—July 7, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12¼c.; Grenada, 11¼c. to 11½c.; Trinidad, 12c. to 12¼c. Jamaica, 9½c. to 9¾c. per lb.

COCOA-NUTS—Jamaica, \$22·00 to \$23·00; Trinidad, \$19·00; Demerara, \$20·00 to \$21·00 per M.

COFFEE—Jamaicas, 7½c. to 8½c. per lb. (ex store).

GINGER—Jamaica, 6¼c. to 8½c. per lb.

GOAT SKINS—Jamaicas, 58c. per lb.

GRAPES FRUIT—Jamaicas, \$2·50 to \$4·00 per box.

MACE—30c. to 35c. per lb.

NUTMEGS—West Indian, 80's, 24c. to 25c.; 110's, 15c. to 16c.; 130's, 11½c. to 12½c. per lb.

ORANGES—\$2·00 to \$2·50 per case; \$4·25 to \$4·75 per barrel.

PIMENTO—4½c. per lb.

PINE-APPLES—\$1·00 to \$1·50 per half box.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 12, 1905.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

MOLASSES—23c. per gallon, package included.

SUGAR—89°, \$1·75 per 100 lb.

Barbados,—July 15, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3·40 to \$3·50 per 100 lb.

CACAO—\$11·50 to \$11·75 per 100 lb.

COCOA-NUTS—\$12·50 per M. for husked nuts.

COFFEE—\$10·00 to \$11·75 per 100 lb.

HAY—\$1·05 to \$1·10 per 100 lb.

MANURES—Nitrate of soda, \$62·00 to \$65·00; Ohlendorf's dissolved guano, \$55·00; Special cotton manures, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, \$1·60 to \$1·75 per 100 lb.

POTATOS, ENGLISH—Bermuda, \$3·50 to \$4·00 per 160 lb. (retail).

RICE—Ballam, \$4·35 to \$4·45 per bag (190 lb.); Patna, \$3·10 per 100 lb.

SUGAR—Muscovados, 89°, \$1·45 per 100 lb.

British Guiana,—July 13, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.

CACAO—Native, 12c. per lb.

CASSAVA STARCH—\$4·50 to \$5·00 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—Rio and Jamaica, 13¼c. to 14c. per lb. (retail).

—Creole, 12c. per lb.

DHAL—\$3·70 to \$3·75 per bag of 168 lb.

EDDOES—\$1·20 per barrel.

MOLASSES—No quotations.

ONIONS—Madeira, 2¼c. to 2½c. per lb.

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—10c. to 32c. per bunch.

POTATOS, ENGLISH—Bermuda, \$3·00 to \$3·50 per barrel (retail).

POTATOS, SWEET—Barbados, \$1·68 per bag; \$1·68 per barrel.

RICE—Ballam, \$4·20 to \$4·25 per 177 lb.; Creole, \$3·90 per bag.

TANNIAS—\$1·32 per barrel.

YAMS—Buck, \$1·50 per bag.

SUGAR—Dark crystals, \$2·50; Yellow, \$3·40; White, \$4·50; Molasses, \$2·50 to \$2·60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·50 per M.

Trinidad,—July 13, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$11·10 to \$11·25; estates, \$11·75 per fanega (110 lb.); Venezuelan, \$11·80 per fanega.

COCOA-NUTS—\$20·00 per M., f o b.

COCOA-NUT OIL—67c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 9¼c. per lb.

COPRA—\$2·60 to \$2·75 per 100 lb.

ONIONS—Stringed, \$2·10 to \$2·20 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·35 to \$1·40 per 100 lb.

RICE—Yellow, \$4·25 to \$4·40; White, \$4·50 to \$5·60 per bag.

SUGAR—White crystals, \$4·00; Yellow crystals, \$3·00; Molasses sugars, \$2·50 to \$3·25 per 100 lb.



A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Treatment of Orchard Soils.

It is desired to draw the special attention of cacao and lime planters in the West Indies to the question of the treatment of soils in their plantations. This matter, being one of great importance, has received the serious consideration of

Dr. Francis Watts, C.M.G., the Superintendent of Agriculture for the Leeward Islands, whose notes in this connexion have appeared from time to time in the *Agricultural News* and other publications of the Imperial Department of Agriculture.

At the Agricultural Conference of 1901, Dr. Watts read a paper, published in the *West Indian Bulletin* (Vol. II, pp. 96-9), on the 'Treatment of Soils in "Orchard" Cultivation in the Tropics,' in which he drew attention to some of the problems concerning the treatment of soils which required solution. The practice of allowing the land between the trees to become covered with grass, upon which cattle were pastured, had been abandoned on account of the damage which the cattle did to the trees, and because in wet weather they trod the soil into a compact mass. Forking between the trees was useful where carefully done, but at the same time liable to cause injury unless great care were taken; and further, hoe-weeding was of doubtful utility. He suggested, therefore, that, at any rate, under certain conditions, it might be a good plan to leave the soil untilled, the only cultivation being the periodical cutting back of the rank grass and weeds with the cutlass. This would be an inexpensive method of green dressing the land. It would, it may be mentioned, probably not be suitable for the cultivation of coffee, tea, and other plants of a low, bushy habit.

The practice mentioned has long existed in Dominica, and experiments were conducted by Dr. Watts to ascertain the manurial value of the weeds growing in young cultivations of cacao, limes, etc. The

results were published in a recent issue of the *West Indian Bulletin* (Vol. V, pp. 287-8). It was shown that when the growth was cut back the soil received quite a substantial manuring, considering the amount of organic matter returned, which was constantly improving the mechanical condition of the soil.

This system has the advantage of preventing the soil from baking, as is often the case in plantations where the attempt is made to keep the land absolutely clean, whereupon forking becomes necessary. The important point to observe is to avoid the formation of anything approaching a permanent turf or grass sod. The cut grass and weeds may either be used as a mulch or may be lightly bedded in.

Special attention might be drawn to the method adopted in an orange plantation in Dominica, which was described in the *Agricultural News* (Vol. III, p. 340) as follows: 'A circle, 10 feet in diameter, is kept clean round each tree: no weeds are allowed to become established in this space, which is weeded at intervals, care being taken not to scrape the soil away from the roots of the tree. The intervening space between the clean circles is not forked or dug up, the grass and weeds being cut down at intervals and used as a surface mulch.' A further reference to this system is made in a recent issue (Vol. IV, p. 212). Dr. Watts reports that no turf has been formed, and the soil remains in excellent condition. 'The existence of this cultivation constitutes an object-lesson of great value to other planters who are sure to be favourably influenced by it.'

While it is not possible to make any general recommendations with regard to this style of cultivation, since it may not be equally suitable under all conditions of climate and soil, yet it is obvious that it is giving good results in Dominica, and it might certainly be tried in a tentative manner, at any rate, in some of the other islands. Considerable expense is entailed in keeping clean the soil between the trees of a cacao or citrus plantation, and it would therefore be to the advantage of the planter if equally good results could be obtained from the method herein outlined. It is probable that in some districts the natural growth of grass and weeds might with advantage be supplemented by the cultivation of some leguminous crop, for which purpose the woolly pyrol would appear to be as suitable as any. Any efforts to adopt this system of cultivation, or a modification of it, in other islands would be watched with great interest.



SUGAR INDUSTRY.

Seedling Canes in British Guiana.

Interesting information was published in the *Agricultural News* (Vol. III, p. 180) in regard to the experimental cultivation of seedling canes at plantation Diamond, British Guiana, during the years 1901-3. In a letter dated June 18 last, Mr. John M. Fleming, the Manager, has forwarded figures for the first six months of the present year, which enable the table, giving the results of growing Bourbon and seedlings for the years, 1901, 1902, 1903, 1904, and 1905 on this plantation, to be extended as follows:—

	1901.			1902.		
	Acres.	Tons.	Aver.	Acres.	Tons.	Aver.
Bourbon	2,912·208	6,735	2·31	2,791·062	6,464	2·31
Seedlings	1,073·082	3,215	2·99	1,317·277	3,706	2·81
Total ...	3,985·290	9,950	2·49	4,109·039	10,170	2·47
Seedlings better by	29 per cent.			21 per cent.		

	1903.			1904.		
	Acres.	Tons.	Aver.	Acres.	Tons.	Aver.
Bourbon	2,895·067	7,194	2·48	2,699·072	6,050	2·24
Seedlings	1,879·267	5,331	2·83	1,882·047	5,550	2·95
Total ...	4,775·034	12,525	2·62	4,581·119	11,600	2·53
Seedlings better by	14 per cent.			31 per cent.		

	1905.		
	Acres.	Tons.	Aver.
Bourbon	1,539·151	3,694	2·40
Seedlings	1,121·111	3,292	2·93
Total ...	2,660·262	6,986	2·62
Seedlings better by	22 per cent.		

The canes reaped during the period January-June 1905, with the results, are stated in the following table:—

	Acres.	Tons.	Aver.
Bourbon	1,539·151	3,694	2·40
B. 208	548·064	1,622	2·96
D. 109	301·235	775	2·57
D. 145	196·262	684	3·47
Various	74·150	211	2·83
Total	2,660·262	6,986	2·62

Mr. Fleming writes:—

You will thus see that seedlings have again given better results than the Bourbon; on this occasion, to the extent of 22 per cent.

B. 208 comprised 1,288·192 acres on December 31, 1904. Since then, 300 acres more have been planted, making a total of about 1,600 acres in that variety on this one estate.

Trinidad.

The pamphlet containing 'Statistics of Trinidad Trade,' specially compiled by Professor Carmody for the Colonial and Indian Exhibition, contains the following interesting information on the colony's trade in sugar products:—

Sugar is prepared exclusively from the sugar-cane in the large central factories of the colony. The largest of these factories has an output of over 150 tons a day. In these factories sugar can be produced polarizing 98 to 99 per cent. of pure sugar. The sugars are purposely now manufactured below this standard, in order to avoid the heavier rates of duty which an unfavourable tariff imposes on sugars equal in quality to refined sugars. None of the yellow or white crystals of similar quality require refining. The refining process removes the greater part of the characteristic agreeable flavour of cane sugar. Beet sugar is quite unfit for consumption until the characteristic disagreeable flavour is removed by refining. Herein lies the chief difference between *cane* and *beet* sugars. It is admitted that the sweetening power of cane sugar is greater than that of beet sugar, and its flavour immensely superior; but the superiority of cane over beet sugar is seen especially in: (1) Sweetening aerated drinks, liqueurs, cordials, champagne, etc.; (2) fruit preserving; (3) brewing; (4) cooking; (5) the preparation of any product in which flavour is of importance.

Great Britain is our best customer, but is closely followed by the United States. Very little muscovado sugar is now made, owing to the closing of the small factories which produced this class of sugar.

MOLASSES.

Large quantities of molasses are produced as a by-product in the manufacture of sugar. Present prices are very low. The molasses from cane sugar are very superior to those from beet, which contain an excessive quantity of alkaline salts. Molasses are used for: (1) Making rum and other spirits; (2) cattle feeding; (3) making golden syrup, treacle, etc.

Trinidad molasses contain about 45 per cent. of cane sugar and 20 per cent. of glucose.

More than half of last year's exports went to Great Britain. In previous years the bulk went to Canada, Portugal, or Martinique.

RUM.

This is made locally from molasses, and about 300,000

gallons are consumed annually in Trinidad. Among the liqueurs made from it, rum shrub and falernum are the best known. Bay rum is another local product. The rum made here is usually of a strength of 40 over proof, but 60 over proof is obtainable. Present export prices are unremunerative. The bulk of our exports goes to Great Britain.

BITTERS.

The world-famed Angostura bitters are made in Trinidad from rum of the finest quality produced in the colony. The other ingredients are a trade secret. These bitters have been frequently imitated, but never successfully. They were originally made at Angostura (now Ciudad Bolivar) by Dr. Siegert as a medicine, but since 1830 have been used both medicinally and as a beverage. Since 1875 the bitters have been manufactured in this colony. They are one of the principal ingredients in the West Indian swizzle or cocktail. The United States and British markets are regular and nearly equal in extent; the German market fluctuates considerably.

OLEANDERS IN THE WEST INDIES.

The following notes on growing Oleanders in the West Indies have been forwarded by Mr. John Belling, B.Sc., Agricultural and Science Master, St. Kitt's:—

The single and double varieties of this elegant eastern plant with their large, scented flowers of deep crimson, light and dark pink, pure white and creamy yellow, are admirably adapted for planting in rows along drives or paths in West Indian gardens. They are perfectly hardy here and have that excellent quality of enduring unharmed a prolonged drought. Owing to the noxious quality of their leaves, their foliage and flowers are untouched by grasshoppers, caterpillars, weevils, and other biting insects.

Oleanders are commonly grown in the gardens of Florida, and plants of all the different varieties may be obtained from Reasoner Bros., Oneco, Florida, at from 15c. to 25c. each. They travel safely. Any required number can then be grown from the stems cut off two or three times a year in pruning.

The plants need the full sun, and the number of flowers is greatly increased by digging in pen manure before planting and mulching with it afterwards. They should be planted, 6 feet or more apart, and the soil, for some feet on each side, should be kept loose and clean.

Oleanders do not flower until they have grown to a certain size, but to produce a well-shaped plant a few prunings are necessary before flowering, each time cutting back the stem to 6 inches or more, when three or more new branches will grow out below each cut end, to be cut back in their turn. After each crop of flowers, too, all the branches should be cut back to a length of 6 inches or so from the last pruning.

Scale insects, which attack the stem causing swellings, or aphides, which occasionally appear on the young leaves, can be immediately killed by applying kerosene emulsion with a spraying pump or syringe, or by wiping the stems with a rag dipped in it. Fairly strong emulsion can be used without harming the leaves; the best time to apply it is after pruning.

Cuttings should be taken from the middle part of a branch, two or three joints long, cut below a node, and only the halves of the three top leaves left on. They root best in a flower-pot full of clean sand, in which they should be deeply planted, the pot being put under a wet wall and not watered too much.



WEST INDIAN FRUIT.

COLONIAL FRUIT EXHIBITIONS.

The following is an extract from a letter received by the Imperial Commissioner of Agriculture from the Secretary of the Royal Horticultural Society in reference to the exhibition of colonial fruit to be held by the Society in December next. An announcement with regard to this and other shows organized by the Royal Horticultural Society appeared in the *Agricultural News* (Vol. IV, p. 180):—

Please accept our best thanks for your letter and for your efforts on behalf of our colonial show. I am especially anxious that your portion of our Empire should be quite fully represented here. Your growers should fully understand that they can get awards for a case of a single fruit, a collection of marketable preserves, just as well as for a collection of many kinds of fruits, provided there is excellence of quality and that there is no actual competition between the several exhibits; and although the medals will be awarded on merit, it is possible for two or more to gain the same award.

The hall and its annexes, measuring 13,000 square feet, enable us to crowd in 5,000 feet of tabling, so there will be plenty of room in December.

BANANA TRADE OF GREAT BRITAIN.

The *U. S. Monthly Consular Reports* for March contain the following note on the banana trade of Great Britain:—

Prior to 1901 the consumption of bananas in the United Kingdom was very limited. In addition to the difficulty of shipping them the price was more or less prohibitive. In 1901, Elder, Dempster & Co. entered into an arrangement with the Colonial Office whereby boats, properly equipped, made regular and speedy trips from Jamaica, landing the fruit at Bristol every fortnight. At the present time the principal banana dealers have a fleet of seven ships employed exclusively in this trade, and three more ships are being built for it. When these are put in commission four cargoes will be discharged each fortnight—two in Bristol and two in Manchester. An average cargo contains 40,000 bunches, and this works out at 80,000 bunches per week for this country, or about 10,800,000 bananas weekly. This, however, is for the winter only; from May to November the demand doubles. The fruit when landed is green and starchy, and is hung in rooms, specially prepared and maintained at a certain temperature, and kept there from ten days to a fortnight, when it is ready for distribution at about 1c. per banana.

GRAFTING CACAO.

Mr. J. Jones, Curator of the Botanic Station at Dominica, has forwarded the following note on experiments carried out at the station in connexion with the grafting of cacao:—

Experiments made in budding cacao seedlings while in bamboo pots in the nursery having failed, some attempts were made at grafting by approach. Seedling plants of the delicate *Theobroma pentagona* were grafted on stocks of *Theobroma bicolor* (the 'tiger' cacao), and a small plot planted out as an experiment. A number of plants of the Criollo variety of cacao are now being worked on *Theobroma bicolor* stocks, and some of *Theobroma pentagona* on Forastero stocks. It is found that cacao unites very readily, the union being complete in from five to six weeks. The plants can then be taken off and are ready for planting.

BEE KEEPING IN CALIFORNIA.

The California crop of comb and extracted honey gathered in 1904 is estimated at 2,000,000 lb., against 8,400,000 lb. in 1903. It comes nearer being a complete failure than has been the case for many years. The cause of this condition of things is the same that has caused shortages in previous seasons—a lack of rainfall during the winter months. This, of course, resulted in a scarcity of honey-producing blossoms, and the bees, consequently, have in many districts not only produced nothing for the trade, but have not collected enough to feed themselves through the winter. About 4,000 people in California are engaged in bee keeping, the number of colonies owned by each averaging 10 to 250, though a number have as many as 1,000 or 1,500 and one bee keeper controls 8,000 colonies. (*Consular Report*, 1904.)

PARA RUBBER PLANTING.

The Nottingham *Guardian*, noting that the Brazilian Government prohibits the export of the seed of the Hevea, which produces Para rubber, says that nevertheless some of the seeds have found their way into France; that plants have been raised therefrom, and that experimental plantings in West Africa have been successful. This year, it is announced, plantations on a commercial scale are to be made in the Gasamaine district of Senegal, to be extended, as seeds multiply, there and in Lower Guinea and Lower Dahomey. It is reported that in time extensive districts now worthless will become productive of Para rubber. (*U. S. Monthly Consular Reports*.)

JAMAICA AT THE COLONIAL EXHIBITION.

The following are extracts from Mr. W. G. Freeman's descriptive article in the *West India Committee Circular* on the Jamaica Court at the Colonial and Indian Exhibition:—

In the last two colonies with which we have been concerned, namely, Trinidad and Grenada, we have had instances of two British West India Islands where cacao has replaced sugar as the chief product. In Jamaica, also, sugar has been deposed from its old position, not in this case by cacao, but by fresh fruit. Jamaica stands alone amongst the West Indian Colonies in respect of the magnitude of its fruit industry, the success of which has been due mainly to the suitability of local conditions to banana cultivation and the comparative nearness of the island to the great market for fruit in the United States. Some 55,000 acres are now under banana cultivation. Fruit is well represented in the Court by fresh bananas, grape fruit, oranges, pine-apples, limes, etc. Jamaica bananas are familiar to every one now. Jamaica oranges are year by year attaining a more important position in the English market, but the excellent grape fruits the colony can produce and send to this country in first-class condition have yet to win their way to popular favour here as they have already done in the United States.

Whilst on the subject of fruit, attention should be directed to the extensive series of preserves exhibited in the Court. Preserves of almost all the chief fruits of the island are shown, ranging from well-known products such as guava jelly to little-known preserves such as tree tomato and cherimoyer jam.

The second industry of the colony is represented by a series of sugars of various grades from Colonel Ward's well-known estate of Monymusk. A map of the colony indicates the location of the 24,000 acres devoted to sugar production. Rum, for which Jamaica has long been famous, is adequately shown.

It is always of interest to dwellers of one country to see the staple food-stuffs of another, and the Jamaica Court contains a very fair selection of the ordinary cereals, pulses, starches, and meals of the tropics. A special word is necessary for the products of the cassava or manioc plant. Fresh specimens of its large, tuberous roots are shown, together with the nutritious 'farine' prepared from them. This farine or cassava meal is, it should be remembered, one of the most important food-stuffs of the tropics. The dainty cassava cakes made from this farine, so appreciated by both residents in and visitors to the West Indies, are exhibited. Cassava starch (which in the near future is likely to be a much more important export of Jamaica than at present) is to be seen, and also tapioca, another product of the same plant, which looms large in the export list from the Straits Settlements. A by-product from the same plant is 'cassaripe' an essential ingredient in the West Indian pepper-pot, and an important factor in many sauces.

Exceptional interest attaches to the exhibit of tea from Ramble estate, St. Ann's, which is stated to be one of the only two tea plantations in the New World, the other being in South Carolina. The venture has been of slow growth, and may be said to have passed out of the experimental stage two years ago when tea was first prepared for the market. Packets of 'Blossom Brand' tea, well packed and attractive to the eye, are on sale in the Court, and it is to be hoped that Jamaica tea will earn a welcome on its merits. Unlike tea, cacao is a well-established industry, and it will be sufficient to record that the Court contains

a good series of the principal grades of cacao produced in Jamaica, and also some chocolate.

Jamaica honey is another product of the colony, which during the last few years has established itself in the markets of the world. Good samples of logwood and other honeys are exhibited. They differ a good deal in attractiveness, owing to various methods of bottling, some of the patterns of bottles used with long, narrow necks being quite unsuited to this product in normal British temperatures.

Jippi-jappa hats, made from the leaves of a palm-like plant (*Carludovica jamaicensis*), very closely related to that from which the famous Panama hats are made, are exhibited in the unfinished and finished states. They form a good substitute for the more expensive 'Panamas,' and as the sales in the Court indicate, have been well appreciated.

An interesting feature of the Court is the collection of living economic plants from the Botanic Gardens, Jamaica. The English climate has not agreed with them all, but the majority are in sufficiently good condition to afford a much better idea of these useful tropical plants than many pages of description.

It will be apparent from these brief notes that the Jamaica Court affords a comprehensive selection of the principal and also the minor products of the colony, and great credit is due to the Commissioners, Mr. John Barclay and Mr. F. Cundall, for their painstaking work, and to all others who have helped to make the exhibit a success.

SALE OF GOATS AT BARBADOS.

The following is an extract from a letter received by the Imperial Commissioner of Agriculture from Mr. J. A. Farmer, of Halton estate, Barbados, in reference to the goats which were advertised for sale in the *Agricultural News* (Vol. IV, p. 212):—

I am glad to say that I have delivered all the goats with the exception of the one kept in reserve for Dominica. I have also heard from the firms, to which they were sent, that they have been received in good order.

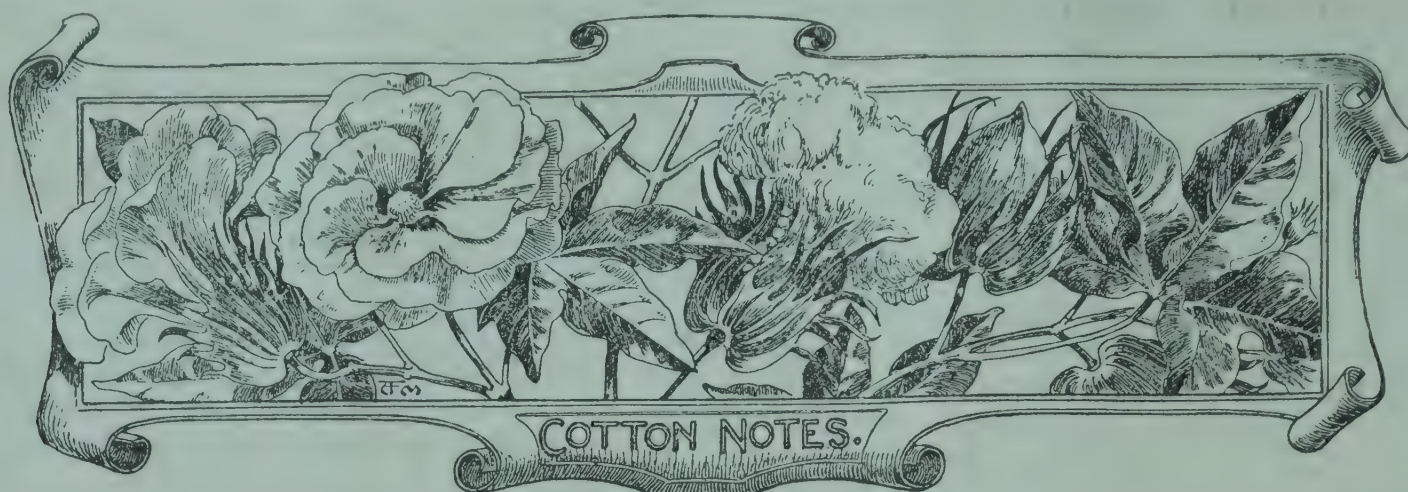
I must also return you my warmest thanks for the interest you have taken in disposing of the goats for me.

TOBAGO PLANTERS' ASSOCIATION.

At a meeting of the above Association, of which mention was made in the last issue of the *Agricultural News* (p. 236), the following committee was elected:—

Chairman, Captain M. Short; Committee: Messrs. T. Orde, J. Evans, D. Hamilton, T. R. Blakely, E. B. Walker, D. Tucker, and H. Swarder; Hon. Secretary, Mr. D. S. Smith.

Guano in Peru. The chief guano deposits of Peru are in (1) the Lobos Islands off the port of Eten, and (2) the Chincha Islands, off the port of Pisco. There are also numerous minor deposits. By a contract entered into in January 1890, the Peruvian corporation, a British syndicate, enjoys the exclusive right of exporting guano from the Peruvian deposits until 3,000,000 tons shall have been exported. Peru may continue to dig guano, but only for the purpose of benefiting national agriculture. It is said that about one-third of the 3,000,000 tons has already been exported by the Peruvian corporation. (*U. S. Monthly Consular Reports.*)



RATOONING COTTON.

In the following memorandum Mr. L. Lewton-Brain, B.A., F.L.S., discusses the matter of ratooning cotton from the point of view of its connexion with the spread of fungoid diseases:—

One of the best ways of dealing with fungoid diseases of plants is by a rotation of crops. Where this is practised the fungi attacking any one crop have a chance to disappear, or, at any rate, to be greatly reduced, before the same crop occupies the same land again. Ratooning will bring about just the opposite state of affairs; fungoid pests will be at their highest development at the end of the first year and the spores will be present in their greatest abundance to attack any fresh growth. Not only this, but these old fields will be centres of infection for the new crop on neighbouring fields. On the other hand, if the old cotton were destroyed, each disease would have to make a fresh start in each new field, by means of spores from outside chance sources of infection. Sea Island cotton has been cultivated for many generations as an annual crop. It is therefore not to be expected that the growth of the second year will be equal in vegetative vigour to that of the first year.

The two most important leaf diseases of cotton are the 'mildew' and the 'rust.' Neither of these attacks young, vigorously growing cotton to any great extent; the plants when growing well seem largely resistant to both diseases. As soon, however, as the plants begin to get older and less vigorous, both 'rust' and 'mildew' begin to make headway. Every old leaf, at this stage, is covered with disease; also, almost every new leaf that appears is more or less affected. If the process is carried further and the cotton ratooned, there will be a constant source of infection present in the older leaves, and in all probability nearly all the new leaves on the ratoon growth will be attacked as they open, by either one or both of the diseases. These diseases will certainly reduce the yield of lint and very probably will affect the quality.

The destruction of the old crop before replanting is also of great importance in dealing with anthracnose of the bolls. In this case if bolls are continually on the ratoon plants, there will be a continuous production of crops of spores of *Colletotrichum gossypii*. This fungus certainly attacks the cotyledons of the young seedlings as well as the bolls. Consequently the ratoon crop presents the fungus a splendid means of carrying over from one season to another. The fungus will be in, as it were, an intrenched position, ready to attack first the seedlings and then the young bolls of any neighbouring first-crop cotton.

Similarly with 'black boll' in the islands where it occurs. The source of infection of the new crop is again diseased bolls; and if there is continuous growth from one season to another, the disease will have a much better chance

of establishing itself at an early period on the new crop. It is of the utmost importance in dealing with this disease, to destroy thoroughly all infected material before re-planting.

To summarize, not only is the ratoon crop itself liable to suffer more severely from fungoid diseases than a first crop, but it is also sure to prove a dangerous source of infection for any freshly planted cotton in its neighbourhood.

FEEDING COTTON SEED TO PIGS.

Professor J. P. d'Albuquerque has informed the Imperial Commissioner of Agriculture that a planter in Barbados has recently lost seven pigs to which he had been feeding cotton seed meal. A careful examination of all the facts has led to the conclusion that the probable cause of death was the injurious effect on pigs of the raw cotton seed, of which mention was made in the *West Indian Bulletin* (Vol. IV, p. 246), in the following words:—

Raw cotton seed cannot be successfully fed to animals, as the lint and dust render it injurious and it is too rich. It appears to be particularly injurious to pigs.

As this warning appears to have escaped the notice of some planters, and as there may be others who are not aware of this curious action of an otherwise valuable feeding stuff, the following extracts from *The Cotton Plant* (published by the U.S. Department of Agriculture), are reproduced for general information:—

The carefully conducted experiments noted below indicate, as a rule, that cotton products are positively injurious to hogs, and cannot be safely used, at least not in any quantity.

The mortality of the pigs receiving cotton seed meal was 87 per cent., roasted seed 75 per cent., and boiled seed 25 per cent. It was also observed that the pigs, escaping sickness and death for thirty days beyond the time when sickness usually sets in, were safe from the attack, but were permanently stunted in growth. Small amounts of cotton seed meal in the slops are stated to have caused deaths in the college herd of swine in previous years. Curtis concludes 'That there is no profit whatever in feeding cotton seed, in any form, or cotton seed meal to hogs of any age.'

Henry says in his *Feeds and Feeding*:—

All efforts to determine the poisonous principle in the cotton seed—if there be one—have thus far proved futile, and the matter is still a mystery. . . .

It may be stated in general terms that when cotton seed or its by-products are fed in reasonable quantity, with a proper complement of other feeding stuffs, satisfactory results are secured with all farm animals except calves and swine.

ST. VINCENT COTTON CROP.

Mr. W. N. Sands, Agricultural Superintendent, has forwarded the following notes on the cotton industry in St. Vincent:—

At the cotton factory the total amount of selected and disinfected cotton seed distributed to date is 21,967 lb., of which amount 10,534 lb. were for local planting, the remaining 11,433 lb. being exported.

I find that the seed sown has germinated extremely well, and the young plants are growing rapidly under the favourable climatic conditions experienced during the past three or four weeks. Practically all planting operations are completed, at least all the chief growers have finished, but one or two smaller growers have still a little more to do. The land selected is much better than last year, and more attention has been paid generally to the selection of suitable lands.

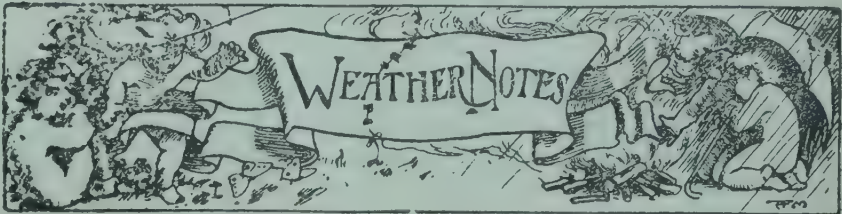
The account sales of the last shipments of cotton came to hand by the mail and they were quite satisfactory. You will be pleased to hear that the Petit Bordel cotton fetched the highest price so far recorded from the West Indies, viz., 1s. 6d. per lb. Other growers obtained prices from 13d. to 17d. per lb. The stained cotton brought 6½d.

I cannot yet obtain the area planted, but three chief growers, Messrs. Hazell, Mr. C. J. Simmons, and Mr. Alex. Smith, have between 500 and 600 acres planted.

EXTERMINATION OF RATS AND MICE.

In the Rochelle district of France, crops of all kinds were severely injured by the depredation of a kind of large field mice or small field rats. In view of the experiments that have been carried out in the West Indies with the Liverpool virus for exterminating rats, interest attaches to the following account of the methods adopted in the Rochelle district, as given in the *Consular Report* for 1904:—

Many methods of extermination have been tried, but the only two which have given any appreciable results up to the present are nux vomica and a special virus prepared at the Pasteur Institute in Paris, rolled oat grain being used as a bait in both cases. The objections to the use of nux vomica have been found to be numerous (poisoning of small birds, game, domestic fowls, and animals); and up till lately the Danysz virus has not proved very efficacious. Now, however, that it is understood that the virus must be distributed while fresh, and protected from the action of light by preparing the bait in feebly lit sheds and spreading it in the fields in the evenings, it is claimed that the mortality induced by it in the field mice, as the result of recent experiments, is as high as 98 per cent. within fifteen days, as not only those ‘campagnols’ which have eaten the bait die within five days, but the others are infected by the disease and die in their turn. The contagious malady induced by the Danysz virus resembles typhoid, but is innocuous to all living beings except rats and mice, to which animals it is fatal. There is a special service attached to the Pasteur Institute in Paris for the preparation of this virus, which is prepared in combination with a tempting broth, and is sent down to the Charentes in bottles on receipt of requisitions from the mayors of the communes affected. The inhabitants of many communes are marshalled by the mayor in semi-military formation, and the bait spread methodically in such a manner as to leave no portion of ground without its share of poisoned grain.



RAINFALL RETURNS.

St. Vincent.

In the Annual Report on the Botanic Station at St. Vincent for 1904-5, Mr. W. N. Sands makes the following observations on the rainfall of the island:—

The rainfall for the year recorded at the Botanic Station, which is near Kingstown, amounted to 97·74 inches, and although this is 12·41 inches below the average for the last fourteen years, it was well distributed, and no heavy floods or washes were recorded.

Except at the Agricultural School (also near Kingstown), there are no other stations on the island where records of rainfall are kept, and it would be highly desirable to establish stations in the country districts, in order that the officers of the Department might be better able to give advice when questions relating to the establishment of new industries arise. The records would also be of great value to planters themselves, in showing to what extent the rainfall affects the quality and quantity of their produce, and serve as a guide to the proper localities for planting different crops.

It will be observed that the average monthly rainfall of the months June, July, August, September, and October is well over 11·00 inches, so that the period from June to October may be considered as constituting the wet season, although the rainfall during the months January, May, November, and December is considerable. The dry season, as shown in the average, is from February to April.

Dominica.

The rainfall at the Botanic Station for 1904 was 72·45 inches or 7·45 inches below the average for the past eleven years. The following table shows that April is the driest month; then there is a rapid rise to July the wettest month of the year, and afterwards a gradual fall to April. The mean yearly rainfall for twelve years is 79·28 inches:—

1904.	Rainfall. Inches.	Mean monthly rainfall. Inches.
January	7·92	4·63
February	5·58	3·02
March	2·16	2·98
April	1·64	1·71
May	1·58	4·99
June	6·00	8·90
July	10·38	11·70
August	7·69	10·03
September	11·32	9·45
October	10·21	8·02
November	3·13	7·09
December	4·84	6·72
Total	72·45	...
Mean yearly rainfall		79·28

The mean rainfall for the whole island for the year, based on returns from twenty-nine stations, is 102·48 inches.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue deals with the important subject of the treatment of orchard soils in the tropics. This is a matter of considerable interest to cacao and lime planters in the West Indies.

Interesting information is contained in the tables on pp. 242-3 in reference to the successful cultivation of seedling canes on plantation Diamond in British Guiana. On the latter page will also be found an account of Trinidad trade in sugar products.

Extracts from Mr. Freeman's descriptive article on the Jamaica Court at the Colonial and Indian Exhibition are published on p. 245. The Court contains a comprehensive selection of the colony's products.

This issue contains a further article on ratconing cotton (see p. 246); this is followed by a note on the injurious effect of cotton seed on pigs.

Brief notes will be found on p. 250 on the various so-called wild bees in the West Indies. The opportunity is taken to assign to the various species the names by which they are known to entomologists. Reference is made on the same page to the occurrence at the present time at Barbados of a number of insect pests.

An interesting departure has been made in Jamaica in connexion with the establishment of model school gardens. These should be of considerable value as object-lessons to teachers who may desire to take up this important work. (See p. 251.)

Cold Storage for the Royal Mail Steamers.

Fruit growers in the West Indies, especially the banana growers of Barbados, will be glad to know that another of the Royal Mail steamers, the 'Orinoco,' has been fitted with the Hall's system of cold storage. This ship now has carrying space for fruit up to 260 tons measurement.

Further, it may be stated that all the mail steamers of the company will shortly be similarly fitted for the carriage of bananas and other fruit from Barbados. Information was received by the Imperial Commissioner of Agriculture by last mail that the work of installing the cold-storage system into the R.M.S. 'La Plata' had already begun.

A New Sugar Plant.

In a note in the *Agricultural News* (Vol. IV, p. 55) on a new sugar plant (*Eupatorium Rebandianum*), discovered by Dr. Bertoni in Paraguay, it was stated that the British Consul at Asuncion had been asked to procure seeds and leaves of this plant for shipment to Barbados.

Five pounds of the leaves and a small package of the flowers of this plant were recently received by the Imperial Commissioner of Agriculture from the British Legation at Asuncion. A number of specimens have been mounted for herbarium purposes, and a quantity of the leaves have been forwarded to Professor d'Albuquerque, who has promised to analyse them and report upon the amount of sugar which this interesting plant contains and the form in which it exists.

H. B. M. Consul at Asuncion has also been asked to endeavour to obtain a good supply of fertile seeds of this plant with a view to making an experiment in growing it in the West Indies.

Trinidad Trade Statistics.

Professor Carmody has compiled for the Colonial and Indian Exhibition a large amount of useful information which has been published under the title of 'Statistics of Trinidad Trade.'

Tables and charts show in a graphic manner the exports of the principal products of the colony during the last three years.

These are sugar and its by-products, cacao, asphalt, cocoa-nuts, and cocoa-nut oil. In the period of thirty years (1875-1905) the sugar exports have decreased in value to one half, while the exports of cacao have increased nearly to three times, and asphalt to eight times.

The direction of the trade in sugar has varied but slightly during the past twenty years, the exports being more or less equally divided between Great Britain and the United States; more recently the British imports of Trinidad sugar have increased, and those of the United States decreased. Cacao, on the other hand, has found new markets. While the exports to Great Britain have not considerably increased during recent years, the exports to the United States have increased to ten times in thirty years, and those to other countries to three times.

Costa Rica Banana Trade.

The banana industry of Costa Rica, according to a recent report of the United States Consul at Port Limon, has reached such proportions that bananas now form the main export of the country. At the close of 1904 about 50,000 acres were devoted to banana growing in Costa Rica, of which 90 per cent. was owned by the United Fruit Co.

Up to 1902 the trade was confined to the United States. It has since been introduced into England with gratifying results to the exporters. No one need have any fear of the demand for bananas ever ceasing to exist. Bananas are not luxuries alone but nutritious food, and, being cheap, will always be used by all classes.

The banana exports of Costa Rica have more than doubled during the last five years, and present indications are that the exports will double again during the next five years.

Tobacco Growing in Jamaica.

In further reference to notes that have appeared in the *Agricultural News* (Vol. III, p. 379, and Vol. IV, p. 77) it may be mentioned that a number of samples of tobacco grown at the Hope Experiment Station, have recently been reported upon by Mr. F. V. Chalmers, the tobacco expert who visited Jamaica last year to inquire into the prospects of the industry. The samples consisted of Sumatra wrapper tobacco and Havana tobacco—both sun grown and shade grown.

Mr. Chalmers reports very highly upon them, especially the outside-grown Sumatra and the shade-grown Havana. The samples show that Jamaica should have no difficulty in competing with Sumatra, Borneo, and Havana. He expresses the hope that some one will be induced to go in largely for production on these lines as he is confident that 'there is a large fortune waiting for somebody who will only produce this tobacco, as herein indicated.'

Castilloa Rubber.

The Secretary of the Mexican Rubber Co. writes to the editor of the *India-Rubber Journal* in reference to quotations for a sample shipment of rubber from Mexico. It is mentioned that the product is from Castilloa trees six and a half years old at time of tapping. Two of the samples were valued at from 5s. 9d. to 6s. and 6s. 3d., the price of fine Para being at the time 5s. 7d. per lb.

It is pointed out that hitherto Mexican rubber has not been acceptable to buyers, but the above quotations would indicate that just as Ceylon cultivated (Hevea) rubber has proved far superior in quality to the Brazilian Para, so the product of cultivated Castilloa can also, by careful preparation, be made to yield a very high-class rubber.

In reporting on these samples the brokers state that 'there is a good, growing demand for plantation-grown rubber so long as it is sent home pure and in good condition. Damp and heat produce stickiness which is fatal to any raw rubber.'

Exports of Java.

According to the *Consular Report* on Java for 1904, the year was a prosperous one for the trade of the island, a large increase in the production of sugar more than compensating for shortages in the coffee and tobacco crops. A review of the island's sugar industry was published in the last issue.

The total coffee crop was small, but the crop of Liberian exceeded estimates, and planters of this kind of coffee had little reason to complain. The tobacco crop was satisfactory, and good prices were obtained. The production of tea was increased by over 3,000,000 lb.

A steady demand for copra caused a large increase in the output. A fair crop of kapok was obtained. Of this product it is reported: 'In France, Germany, and the United States, considerable attention is being given to kapok, as, on account of its insubmergibility, it has been proved to be a satisfactory substitute for cork in the manufacture of life-belts.' Over 77,000 bales were exported during the year. The exports of teak and tapioca flour (26,634 tons) also show an increase.

A Department of Agriculture was instituted during the year under Professor M. Treub, formerly Director of the Botanical Gardens at Buitenzorg.

English Hares at Barbados.

Brief mention was made in the *Agricultural News* (Vol. I, p. 167) of the introduction into Barbados, over sixty years ago, of English hares. The survival of these animals under what may be considered particularly adverse circumstances—since they have had to contend with the mongoose and, further, have been under the disadvantage of having very little 'wild' land in which to live (most of the land in Barbados, not actually under cultivation of sugar-cane or other crops being in sour grass)—is a point of considerable interest to naturalists.

It was considered that it would also be of interest to ascertain whether these animals now show any variation from the normal type of English hare. With this object in view, an attempt was made in April 1903 to send a pair of these animals to the Zoological Gardens in London. Unfortunately, cold weather was experienced during the voyage and neither of them survived.

At the request of the Secretary of the Society, a further attempt has recently been made by the Imperial Commissioner of Agriculture. In this instance, three hares (two does and one buck), kindly presented by Mr. A. A. Evelyn, of Spencer's estate, were shipped from Barbados in R. M. S. 'La Plata' on July 1 last. They had been reared in captivity from a very young stage and it was thought they would consequently bear the confinement on board-ship. By last mail the Imperial Commissioner was informed by the Secretary of the Zoological Society that the hares had arrived safely at the Gardens. Dr. Chalmers Mitchell promises to make a careful examination of them as compared with the English hare to ascertain whether a new variety has been formed, in consequence of the hares living under such different conditions.



INSECT NOTES.

Wild Bees.

In the publications of the Imperial Department of Agriculture reference has frequently been made to the wild bee, the cow bee, and the Jack Spaniard, or maribunta.

The scientific names of some of these insects having been ascertained, the following notes are given in order that more definite references may be made to these species.

The wild bee (*Polistes annularis*) is found in Barbados and St. Vincent. It is distinguished by the large, yellow spot on the first segment of the abdomen. The antennae are black in the middle and lighter at base and apex, the thorax is black and reddish, and the legs are black, banded with light yellow. In St. Vincent this species is of a lighter colour throughout.

The cow bee (*Polistes bellicosus*) is stouter than the wild bee. It is found in Barbados. The face is bright yellow, the thorax has narrow, yellow markings, and each segment of the abdomen is bordered with a narrow, yellow band.

The Jack Spaniard or maribunta (*Polistes fuscatus instabilis*) is found in Barbados, Montserrat, and St. Kitt's. It is smaller and more slender than the two preceding and there is a greater contrast of colour, the black being a deeper black, and the yellow of the thorax and abdomen more conspicuous. The face, antennae, and legs are coloured and marked as in the cow bee (*P. bellicosus*), while the yellow markings of the body are more like those of the wild bee (*P. annularis*).

Insect Pests at Barbados.

During the last few weeks reports have come to hand of the occurrence of the cotton worm in the fields of young cotton at Barbados. In many cases the insects have apparently spread from fields of old cotton which planters have, contrary to the advice of the Imperial Department of Agriculture, omitted to destroy. Planters are again urged to be on the watch for this insidious pest and to lose no time in applying Paris green to their cotton.

At the same time reports have been received of damage to tobacco and cow peas by cutworms, and of the occurrence of the corn worm in the crown of the plants both in Indian and Guinea corn. Woolly pyrol has also been attacked in some localities by the well-known woolly pyrol worms.

The somewhat early appearance of these pests would appear to indicate that this is to be a season of abundance of insects. In the case of leaf-eating insects applications of Paris green at the first appearance of the caterpillars will check the outbreak. Insects in the crown of the corn plants may be controlled by the use of Paris green and corn meal at the rate of one teaspoonful of Paris green to one quart of corn meal. The mixture is applied by means of a shaker, from which it is sprinkled or shaken into the centre of the plant (see *Agricultural News*, Vol. IV, p. 90).

Success has been reported in combating the cutworms by means of a poisoned bait of bran and Paris green. One or two pounds of Paris green to 50 lb. of bran is made into a stiff mash by stirring in a mixture of molasses and water.

A tablespoonful or small handful of this bait is put on the ground at the base of the plants, and when the worms come to the surface of the ground to feed at night the bait is found readily.

SISAL HEMP CULTIVATION.

The following note is extracted from the *Anglo-Indian Review*, London, March 1905:—

The cultivation of sisal hemp continues to increase in South America, while in Egypt it has now been clearly proved that the fibre can be produced easily and profitably. One of the difficulties with which growers hitherto have been met is the fact that the London quotations are dependent upon New York. Accordingly, if a sample is sent over from Egypt the price quoted for bulk here would be that ruling in New York to-day. The market in New York fluctuates, and English fibre brokers would be glad to see imports coming to London direct in order that the centre of quotations might be changed.

In Uganda recent experiments have proved that sisal can be grown. The crop is one which takes some years to come to maturity, but a ready use is always found for the product at remunerative prices. In Queensland, also, experimental plantings are being made. It is reported that the suckers there require three to four years to mature, and this is true of other countries; but after that, once or twice a year, a large amount of leafage containing the fibre can be gathered for a period of over ten years, while land which is practically useless for other purposes can be utilized for growing. The plant is said to thrive well in rocky, volcanic soil, on hilly slopes, amid blocks of stone and heaps of boulders, and, in fact, in places unfit for the plough and the growth of other vegetable products. In 1893, the Queensland Agricultural Department obtained 1,000 plants from Yucatan. The penal establishment at St. Helena is the only place where the cultivation has passed beyond the experimental stage, and there some fine specimens of the fibre have been produced by hand labour; the Government is importing the necessary machinery, and the industry is being pressed forward. It should be mentioned that there are many fibre-stripping machines on the market adaptable for sisal hemp purposes, but before any particular one is bought it would be well to obtain samples of the fibre as treated by it, as the price largely depends upon the appearance of the fibre produced. It should be clean and white and free from all appearance of crushed vegetable matter.

SISAL HEMP IN BRITISH GUIANA.

Mr. A. W. Bartlett, Government Botanist in British Guiana, refers as follows in his Annual Report to experiments with sisal hemp in the colony:—

Last year a few plants of sisal hemp were sent to various Government Stations to be tried. Reports show that the plants are doing well at most of these places.

Some plants are making capital growth on sandy soil near a station about half-way along the Demerara-Essequibo railway, and the leaves have reached a length of 4 to 5 feet.

Samples of the fibre, prepared from plants growing in the Botanic Gardens and shipped to England for examination, were very favourably reported upon and valued at from £36 to £38 per ton, c.i.f., net, by various agents.

The plant grows excellently in many of the soils of the colony and it only remains to be determined whether it produces a sufficiency of fibre to pay to grow it on a commercial scale.

EDUCATIONAL.

Model School Gardens in Jamaica.

The following is extracted from the Annual Report for the year 1904-5 of the Superintending Inspector of Schools in Jamaica :—

The sum of £50 was placed on the estimates of the Department of Public Gardens and Plantations for model school gardens in country districts, which should be for the guidance of neighbouring teachers, in the year 1903-4, and this department was requested to recommend ten prominent and accessible centres suitable for such gardens. One was to be at Hope Gardens. The aim in view was to give special attention to the agricultural capabilities of each district, and the assistance of Agricultural Instructors was practically assured. The grant for each garden was to be expended in clearing the land, preparing and planting plots with various crops, erecting a substantial fence to protect the garden against trespassing by stock, and in purchasing seeds and plants.

At a meeting of the Board of Agriculture it was decided, in view of the special and unforeseen expenditure entailed by the hurricane that passed over the island in August 1903, not to incur any expenditure for model school gardens in that year.

A re-provision of the vote was made for the year 1904-5, and it was considered by the Government that the full responsibility for the construction, laying out, and fencing of such gardens should be thrown on the principal teacher of each school to which a grant was made. An Instructor was to visit the school and advise as to laying out the garden, and to approve plans and estimates.

Managers have been very willing to co-operate, and nine model school gardens have been established during the year.

The model school garden at Hope is carried on as a part of the Experiment Station. It is near the tobacco curing house, and all teachers would do well to inspect it from time to time when they are able to do so.

A model school garden begins its work under the most favourable conditions. The principal teacher receives expert advice and a grant is made for initial expenses and, since it is in an easily accessible position, the teacher continues frequently to receive advice and criticism from one of the Instructors.

Agricultural Education in British Guiana.

The Science Lecturer in British Guiana (Mr. E. W. F. English) has reported as follows on the results of the science teaching at Queen's College, at the Catholic Grammar School, and to the primary schoolmasters :—

During the past year the science work at Queen's College has been carried on on the lines laid down in January 1904, when it became possible to include practical chemistry in the school curriculum. The three upper forms receive three hours' work each week in both theoretical and practical chemistry, the junior forms two hours.

Eleven boys took senior chemistry papers in the Cambridge Local Examination, two of whom passed in theoretical and two in practical chemistry. Of the twelve junior candidates, two passed in both theoretical and practical chemistry, and two in theoretical only. Two boys took the preliminary papers, one of whom passed in both branches. Considering these results with the fact that I have not thought it to be for the best interests of their work to adhere

too closely to the examination syllabus, I think they are not unpromising, though several boys proved very disappointing. I notice amongst the junior boys several of very distinct promise.

The class at the Roman Catholic Grammar School has been reduced in number at the desire of the Principal to have the work carried to a higher standard, and to aid in effecting this he has organized a preparatory class in the elements of chemistry and physics. This is an advance on the previous arrangement.

Courses of lectures to schoolmasters in the scientific principles underlying the practice of agriculture have been given in Georgetown, in Anna Regina for the county of Essequibo, and in New Amsterdam for that of Berbice. Considering the shorter course delivered in the two latter centres, the results obtained were more satisfactory than in Georgetown, where the papers sent in at the examination were not of as high a standard as those of the previous year, there being a decided tendency to rely upon having committed to memory a series of facts, formulated in set terms, while shirking the discussion of the principles underlying them, a condition least of all to be encouraged amongst those intended to teach.

The demonstration-lectures appear to be appreciated, and regrets have been expressed at the shortness of this course.

In reference to this Professor Harrison says :—

Judging from the results of the examination papers set to the Queen's College boys at the end of the terms and to the attendants at the lectures to schoolmasters, I am of opinion that the study of natural science is slowly but surely being extended in the colony.

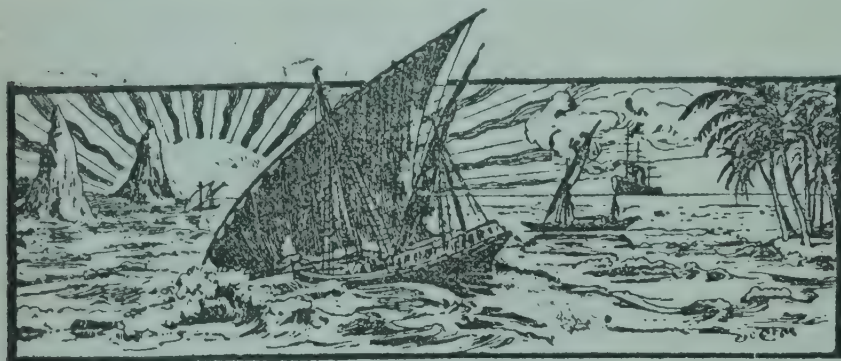
WIRELESS TELEGRAPHY.

The following are extracts from a report on wireless telegraphy by Sir W. H. Preece, K.C.B., published by the Government of Trinidad as Council Paper No. 70 of 1905 :—

The most valuable experiments in this direction [for war purposes] have been made by the United States Army Engineers under Major Squier, which show that the most serious obstacles are live trees and tropical vegetation. Every tree is a leak. It absorbs energy from the electric waves. A forest is thus much more an enemy to wireless telegraphy than a mountain range.

Wireless telegraphy is really still in its experimental stage. Great progress has been made and will continue. The sea is its domain. Here it is practical and even commercial, but not reliable for continuous periods or for long distances. It has not yet been proved effective over-land, excepting for comparatively short distances where the earth is moist. There are very few places where it can compete financially with telegraphs and telephones.

Finally, I desire to reiterate emphatically the opinion that I have expressed from the first, that the home of wireless telegraphy is the sea, that its value is its unique ability to maintain communication with moving masses like ships at sea and soldiers on the march. It is not reliable, and it would be folly to employ it, for telegraphic purposes where simple wires can be erected and telephones employed. It is not even cheap, for though the capital expenditure is smaller, the working expenses are greater and the speed of working is less. The British Post Office has not found it necessary to instal such a plant on any one of the innumerable islands which stud our larger islands for commercial telegraphy.



GLEANINGS.

The exports of arrowroot from Bermuda in 1904 amounted to 10 tons 2 cwt., of the value of £1,398; the quantity exported in the previous year was 9 tons 9 cwt., valued at £1,300.

Minister Powell, writing from Port-au-Prince, Hayti, under date of March 23, 1905, says: 'I have the honour to state that the cotton crop this year will exceed by 25 per cent. the crop exported last year, which amounted to 75,000 bales.' (*U.S. Monthly Consular Reports.*)

According to the *West India Committee Circular*, the attendance at the Colonial and Indian Exhibition since the opening day, up to July 18, has been 530,614. A number of prominent West Indians had signed the Committee's register during the previous fortnight.

Mr. August Busek, of the Bureau of Entomology of the U.S. Department of Agriculture, was recently in Barbados. Mr. Busek is making a long stay in the West Indies for the purpose of collecting mosquitos. He had visited Trinidad and proposed to spend some time in Hayti and San Domingo.

The Imperial Commissioner of Agriculture has received from Mr. E. Lomas Oliver a cotton handkerchief made entirely from Barbados cotton. It may be mentioned that similar handkerchiefs have, by request, been made for His Royal Highness the Prince of Wales and the Duke of Marlborough.

The Secretary of Agriculture, Nova Scotia, has informed the Imperial Commissioner of Agriculture that he will have a good opportunity for selecting poultry of improved breeds, which might be required for the West Indies, at the forthcoming Provincial Exhibition which opens at Halifax on September 12.

Under the Auspices of the Antigua Agricultural and Commercial Society, thirty-six $\frac{1}{10}$ -acre plots have been marked off at Skerrett's, about five minutes' walk from St. John's, and twelve of these plots have already been taken up, the people paying a quarter's rent in advance. At the last meeting of the society an Allotment Committee was appointed.

A notice has been inserted in the *St. Vincent Gazette* urging that owners of stock should immediately report to the nearest Police Station any case of sudden sickness or death among stock. An animal so dying should on no account be cut up for food, as it may have died of anthrax, which is a very dangerous disease, from which persons cutting up such an animal may die. The carcass should, if possible, be burnt.

The report on the seventh annual Dominica Agricultural Show, held on February 23 and 24, 1905, is published in the *Dominica Official Gazette*. The expenses of the show were £60 4s. 5d., of which £25 was provided by the Imperial Department of Agriculture.

A correspondent in Barbados desires information in regard to the 'Wall Swallow.' This bird is not mentioned in Colonel Fielden's list, published in the *West Indian Bulletin* (Vol. III, pp. 333-52). As it may also be known by another name, readers familiar with it are invited to communicate with the Imperial Commissioner of Agriculture.

A gentleman in Antigua has a small collection of orchids, comprising some twenty-three species, of which he is desirous of disposing. Some of the plants have already flowered. They would form a nice nucleus for a collection. The price asked for the collection is £3; packing and freight, extra. Further information may be obtained on application to—A. S. Archer, St. John's, Antigua.

The annual report of the Shortwood (Female) Training College for teachers in Jamaica states that regular instruction has been given to the students in agricultural science by Mr. Teversham, and in gardening by Mr. Cunningham. 'The Lady Principal reports that the third-year students now have charge of a small "model school garden" in which each second-year student has a plot of her own.'

Messrs. Henry W. Frost & Co. report on the Sea Islands cotton market, under date July 20, as follows: 'The 38 bales of "fully fine" were taken this week, leaving in stock now only about 100 bales—chiefly undesirable cotton and held off the market under instructions from the owner for higher prices. We have had a return of more favourable weather this week, and the crop generally is reported in a promising condition.'

The *Colonizer* for July contains an interesting summary of 'a chat with Mr. Algernon Aspinall, the Secretary of the West India Committee, on West Indian Prospects.' Mr. Aspinall discussed the openings for colonization and settlement, laying special stress on the prospects of lime and cacao cultivation in Dominica, where, he stated, every assistance would be given by the officers of the Imperial Department of Agriculture.

The Agricultural Superintendent at St. Kitt's reports that at Molineux estate a trial is being made with rubber planting, and 439 plants of *Castilloa* and 263 of *Funtumia* were raised at the Botanic Station and distributed to this estate. The young trees are doing well. It is proposed to raise as many rubber plants as possible at the station during the present year with a view to the extension of rubber cultivation in the island.

Mr. J. H. Hart, F. L. S., Superintendent of the Royal Botanic Gardens, Trinidad, returned from England in the R. M. S. 'Orinoco' on August 1. As was stated in the *Agricultural News* (Vol. IV, p. 108), Mr. Hart visited England as the Commissioner for Trinidad at the Colonial and Indian Exhibition, at the Crystal Palace. His efforts in connexion with the Trinidad exhibits have been greatly appreciated, and they are understood to have contributed largely to the success of the Trinidad Court. Mr. Hart has been relieved by Mr. W. E. Smith, the Manager of the Trinidad Government Railway.



ST. VINCENT: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND LAND SETTLEMENT SCHEME, 1904-5.

Botanic Station.—The total expenditure during the year amounted to £562 4s. 11d. The sale of plants, etc., yielded an income of £39 5s. 8d.

There was again a large increase in the number of economic plants distributed during the year, the number (26,256) being in excess of that of any previous year. An important feature of the plant distribution is that special attention is evidently being paid to the growth of cacao and other permanent crops.

An interesting note on the cacao industry shows that a steady increase has been made in the output of cacao during the past five years. It is anticipated that this industry will regain the satisfactory position which it occupied before the hurricane of 1898.

Mr. Sands also reports on the progress of the cotton industry. At the cotton factory 237,734 lb. of seed-cotton had been dealt with up to the end of the year; 171 bales (61,011 lb.) of lint had been shipped. The area planted in cotton was 1,471 acres.

The usual routine work has been carried on at the station. A large number of plants were planted out during the year; and the general condition of the garden is quite satisfactory.

In reviewing this report Sir Daniel Morris expresses his deep appreciation of the work done by the Agricultural Superintendent at the Botanic Station, and also in connexion with the cotton industry and in the promotion of agricultural progress generally in the island.

Agricultural School.—Mr. Patterson reports that there were twenty-two boys at the school on March 31 last. The health of the boys has been good.

In the experiment plots provisions have been grown by the boys, and trials have been made of various fodder crops. The indoor work was tested by two examinations during the year. The results showed that, on the whole, fair progress had been made.

Several changes occurred in the staff. Mr. Knowles left for Fiji, and his place was taken temporarily by Mr. A. J. Clarke, of Harrison College, Barbados, until the arrival of Mr. W. H. Patterson, who took up the duties of the Resident Mastership at the end of January.

Bearing in mind these changes and their necessary effect on the results, the report cannot but be regarded as indicating that progress has been made and that useful work is being carried on at the school.

Land Settlement Scheme.—The Agricultural Instructor's report deals with his duties in connexion with the allotments at Park Hill, New Adelphi, Richmond Hill, Clare Valley and Questelles, Cumberland Valley, and Linley Valley, and also the Experiment Station at Georgetown.

The system of wind-breaks determined on for these estates (now 16 miles in length) has continued to receive attention. It is satisfactory to record that 15,424 economic

plants were distributed to allottees during the year, of which 15,060 were cacao plants.

Mr. Osment reports that the allottees have, for the most part, worked their lands to good advantage. Provisions have been largely grown by allottees who also rear poultry and other small stock. The prospects of cacao cultivation are considered satisfactory.

The report indicates that a decided improvement is noticeable on the cultivations under the Land Settlement Scheme.

TOBAGO: ANNUAL REPORTS ON THE BOTANIC STATION, ETC., 1904-5.

Botanic Station.—The report of the Curator of the Botanic Station shows that the expenditure for the year, including salaries, was £650. The receipts from the sale of plants and produce amounted to £39 3s. 7½d.

There was again a large increase in the number of economic and other plants sold and distributed from the station. The rainfall for the year was only 59.34 inches: the year was the driest since the station was established.

Taking into consideration the large amount of extra work the dry season entailed in keeping the garden in order, the work has been carried on in a very satisfactory manner. A number of new plants were introduced.

The experiment plots at the station and in the country districts are calculated to serve a useful purpose as object-lessons.

Agricultural Instructor.—The duties of the Agricultural Instructor have been mainly in assisting the holders of Crown Lands, of whom there are now 230. He also visited seventeen school gardens, in some of which useful work was being accomplished.

The returns of the number of cacao trees under cultivation show an increase of 15,905 trees, of which 10,130 are in bearing.

In reviewing these reports the Imperial Commissioner of Agriculture testifies, from a recent personal inspection, to the eminently satisfactory condition of the station and to the useful work being carried on there.

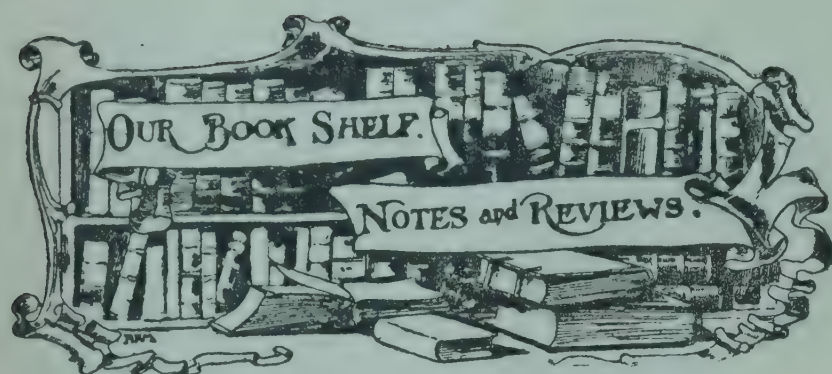
DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados for Jamaica in the R. M. S. 'Orinoco' on Monday, July 31. It is expected that Sir Daniel Morris will return to Barbados about the end of August.

Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., Island Professor of Chemistry and Chemist-in-charge of the Sugar-cane Experiments at Barbados, was expected to embark for England by mail steamer to-day on leave of absence.

Mr. A. J. Jordan, Curator of the Botanic Station at Antigua, has been appointed Curator of the Government House Gardens at Trinidad. Mr. Jordan will probably leave Antigua on August 23.

On the recommendation of the Director of the Royal Botanic Gardens, Kew, the Secretary of State for the Colonies has appointed Mr. Thomas Jackson Curator of the Botanic Gardens at Antigua, in succession to Mr. A. J. Jordan. It is expected that Mr. Jackson will arrive from England by next mail.



SOUVENIRS OF JAMAICA: By E. J. Wortley, Assistant in the Government Laboratory. *Jamaica: The Educational Supply Co., 16, King Street, Kingston, 1905. Price 6d.*

In this little pamphlet Mr. Wortley has brought together 'notes on the manufacture of curiosities and other souvenirs' for the information of visitors to the island. Mention is made of the various native industries, such as the making of hats, baskets, brooms, mats, fans, d'oyleys, fern work, shell ornaments, pottery, preserves, etc., etc. In each section the author gives 'plant notes,' which are interesting remarks on the plants which furnish the various materials used in making these ornaments, curios, etc. Fern workers have some 500 species of ferns in Jamaica from which to choose their material for making d'oyleys, lamp shades, and other pretty ornaments.

A long list of seeds used for ornaments is given: those most frequently used are Job's tears, Circassian seeds, soap berries, and the yellow and grey nickers. A long list is also given of the woods used for walking sticks.

Undoubtedly, many of Jamaica's visitors will be glad to have the information in this pamphlet, and will be grateful to Mr. Wortley for the energy and care he has bestowed upon its preparation. It should also find a place at the various exhibitions in Great Britain and Canada where West Indian products are exhibited.

JAMAICA COOKERY BOOK: By Caroline Sullivan. *Jamaica: Aston W. Gardner & Co., 127, Harbour Street, Kingston. Second Edition, 1897.*

This is not a new book but it is deserving of being more widely known throughout the West Indies. It has for some time been extensively used and appreciated in Jamaica and has been found particularly useful to English residents in that island. It contains '364 simple cookery receipts and household hints.' These are confined to every-day dishes which come under immediate notice in Jamaica.

In addition to receipts for ordinary table dishes, hints are given on the preparation of pickles, sauces, drinks, etc.

RUBBER PLANTING IN SAMOA.

The following note is extracted from the *Consular Report* on the trade of Samoa for 1904:—

India-rubber is now exciting much attention in Samoa. The *Castilloa elastica* is doing better than other species. When planted 20 feet apart it attains in a couple of years a height of 10 to 12 feet, and is expected to yield good sap in about eight years. It grows well here in high altitudes (2,000 feet), as well as on the coast, and dislikes shade.

Whether there is danger, as in the case of vanilla, of the supply of rubber exceeding the demand to an extent sufficient to make the price unremunerative to the grower, is difficult to forecast; but as rubber, like cacao is a necessity, and not a luxury, and, besides, cannot be grown everywhere, this danger does not appear to be a serious one.

COCOA-NUT MEAL AS A FOOD-STUFF.

Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., has forwarded to the Imperial Commissioner of Agriculture the results of analyses of cocoa-nut meal from Trinidad. He reports the sample to be well prepared and in a fresh and wholesome condition. Cocoa-nut meal should form a valuable addition to West Indian feeding-stuffs.

The results of these analyses are shown in the following table in comparison with the composition of American cocoa-nut meal as given by Henry in his *Feeds and Feeding*:—

COMPOSITION OF COCOA-NUT MEAL.

Percentage composition.	Trinidad.	American.
Water	9.08	10.3
Ash	4.70	5.9
Protein	21.50	19.7
Crude fibre	4.73	14.4
Nitrogen-free extract	41.34	38.7
Oil	18.65	11.0

It will be seen that the Trinidad product is superior to the average American by reason of its higher protein content and its greater freedom from indigestible fibrous matter. Less of the cocoa-nut oil is apparently extracted in Trinidad.

FEEDING VALUE OF COCOA-NUT MEAL.

Henry makes the following remarks, in his *Feeds and Feeding*, on the feeding value of cocoa-nut meal:—

The residue in the manufacture of cocoa-nut oil is known as cocoa-nut or cocoa meal. It is used quite extensively by dairymen in the vicinity of San Francisco. Cocoa-nut meal has the reputation of producing fine butter of considerable firmness, and is therefore recommended for summer feeding to dairy cows. It may be used with advantage for swine and sheep, serving also as a partial substitute for oats with working horses.

The French war department investigated the value of cocoa-nut meal for horses. The results proved that cocoa-nut meal was equal and even superior to the same weight of oats. According to French prices of feeding stuffs, a substitution as in the above experiment would bring about a reduction in the cost of keeping army horses of \$10.00 each per year.

The digestible nutrients and fertilizing constituents are given by Henry as follows:—

Dry matter in 100 lb.	...	...	...	89.7 lb.
Digestible nutrients in 100 lb.	Protein	...	...	15.6 "
	Carbohydrates	...	...	38.3 "
	Fat	...	...	10.5 "
Fertilizing constituents in 100 lb.	Nitrogen	...	...	3.3 "
	Phosphoric acid	...	...	1.6 "
	Potash	...	...	2.4 "

Destruction of Ticks. The Manager of Barbuda (Mr. H. G. S. Branch), having experimented with kerosene emulsion, applied by means of a knapsack sprayer to cattle in an attempt to rid them of ticks, has arrived at the conclusion that a mixture of tallow and kerosene applied by hand is both cheaper and more effective than the former method.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on drugs and spices in the London market for the month of June has been received from Mr. J. R. Jackson, A.L.S.:—

GINGER.

It is satisfactory again to draw attention to the continued demand and good prices realized for Jamaica ginger which, at the spice sales on June 7, met with brisk competition. Out of 690 barrels of Jamaica offered, some 600 were sold at prices ranging from 30s. to 42s. for ratoon, to 54s. to 69s. for good bold bright. The demand for Cochin and Calicut was slow: ordinary rough Cochin was bought in at 22s. 6d. A fortnight later the prices for Jamaica stood somewhat higher. Some 1,200 packages were offered and 500 sold. Cochin and Calicut met with a slow demand. At the last sale on June 28, a quieter tone prevailed; of 300 barrels of Jamaica offered, 100 were disposed of. The higher qualities still fetched steady prices, but the medium qualities dropped from 1s. to 2s. Again there was but little or no demand for Cochin and Calicut.

ARROWROOT.

At the sales in the early part of the month this article was very little in demand, but at the auction on the 21st. there was a steady sale of St. Vincent at 1½d. per lb. for good manufacturing.

NUTMEGS, MACE, AND PIMENTO.

All these articles sold at steady rates throughout the month.

On the 7th. there were small sales of mace at 2s. 5d. for fine bold, and 1s. 1d. for broken. Good pale West Indian sold at 1s. 4d. to 1s. 5d.; fair, 1s. 2d. to 1s. 3d.; and 1s. for pickings.

The quotations for pimento of fair quality were steady at 2½d. per lb.

SARSAPARILLA.

At the auction on the 8th. 4 bales only of grey Jamaica were offered and sold at 1s. 4d. for fair grey. Dark coarse fetched 1s. 2d., and 7 bales of native mixed were bought in. A fortnight later the drug was still quoted at firm rates. Fifteen bales of grey Jamaica were offered and sold at 1s. 4d. per lb. for good sound grey to country-damaged, and 1s. 3d. for grease-damaged. There was no Lima-Jamaica offered, and it was stated that none was to be had in New York.

LIME JUICE AND TAMARINDS.

Lime juice throughout the month was in steady demand at increasing prices. At the first sale five packages of raw West Indian of fair flavour were disposed of at 1s. per gallon. A fortnight later good raw pale West Indian fetched 1s. 1d., which price was maintained at the close of the month.

The prices asked and obtained for West Indian tamarinds showed an upward tendency. In the middle of the month fair Barbados were quoted at 11s. 6d. in bond; 13s. 6d., duty free, was asked by one holder. At this sale fair black Calcutta realized 9s., and the commoner sorts relatively lower prices. A week later the new-crop dark Antigua, in bond, sold at 8s. 6d. to 9s., and good pale 12s. 6d. to 13s. 6d.

ANNATTO SEED AND KOLA.

At the auction on the 22nd. seven packages of fair

bright West Indian annatto seed were sold at 6d. per lb., and at the close of the month 6½d. to 7d. was being asked.

Of kola it was reported in the middle of the month that dried West African nuts were being disposed of at Liverpool on the quay at 2½d. to 2¾d. per lb. A week later 1 bag of fair washed West Indian was offered at Mincing Lane and sold at 4½d. On the 28th. twenty-four baskets of green West Indian were offered and eight disposed of at 7½d. per lb. These probably formed part of a consignment that arrived by the 'Trent' and which I saw on board that vessel during the unloading of the Barbados bananas at Plymouth on June 14. They were then in splendid condition, plump, and of a healthy green.

WEST INDIAN PRODUCE STALL.

The accompanying illustration (fig. 17), the block for which has been lent for the purpose of reproduction in the *Agricultural News* by the Secretary of the West India Committee, shows the West Indian Produce Stall at the Colonial and Indian Exhibition, to which reference has already been made in these columns (p. 220). The stall stands in the centre of the West



FIG. 17. WEST INDIAN PRODUCE STALL.

Indian Court. Here every kind of West Indian produce is displayed, and such articles as sugar, preserves, honey, lime juice, and arrowroot, find a ready sale among the numerous visitors to the exhibition.

Produce may be sent to this stall for sale, subject to payment of 10 per cent. commission to the West India Committee towards expenses, and 2½ per cent. to an attendant, freight to be paid by the consignee.

MARKET REPORTS.

London,—July 18, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 14, 1905; and 'THE PUBLIC LEDGER,' July 15, 1905.

ALOES—Barbados, 15/- to 45/-; Curaçoa, 18/- to 45/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
BEE'S-WAX—£8 2s. 6d. to £8 15s. per cwt.
CACAO—Trinidad, 55/- to 62/- per cwt.; Grenada, 50/- to 53/6 per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·30d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
ORANGES—Jamaica, 15/- to 17/- per box.
PINE-APPLES—Antigua, 12/- to 16/- per barrel.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, ordinary to good ordinary, 42/- to 45/- per cwt.
HONEY—17/- to 23/- per cwt.
ISINGLASS—West Indian lump, 2/3 to 2/8; cake, 1/- to 1/1 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £15 10s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb.; Distilled Oil, 1/7 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fine bold pale, 1/7; fair to good red, 1/2 to 1/4; red 1/- to 1/1 per lb.
NITRATE OF SODA—Agricultural, £11 3s. 9d. per ton.
NUTMEGS—64's 1/5; 75's, 11d.; 85's, 9d.; 100's, 7d. per lb.
PIMENTO—2½d. to 2¾d. per lb.
RUM—Demerara, 1s. 3d. per proof gallon; Jamaica, 2s. 1d. per proof gallon.
SUGAR—Yellow crystals, 17/- per cwt.; Muscovado, 15/9 to 17/6 per cwt.; Molasses, 12/- to 15/- per cwt.
SULPHATE OF AMMONIA—£12 10s. per ton.

Montreal,—July 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.
COCOA-NUTS—Jamaica, \$22·00 to \$24·00; Trinidad, \$19·00 to \$21·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
LIMES—Jamaica, \$6·00 per barrel.
MOLASCUIT—Demerara, \$1·32 per 100 lb.
MOLASSES—Barbados, 33c.; Antigua, 28c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 20c. per lb.
ORANGES—No quotations.
PIMENTO—Jamaica, 4½c. to 5c. per lb.
PINE-APPLES—No quotations.
SUGAR—Grey crystals, 96°, \$2·50 to \$2·75 per 100 lb.
—Muscovados, 89°, \$2·00 to \$2·25 per 100 lb.
—Molasses, 89°, \$1·75 to \$2·00 per 100 lb.
—Barbados, 89°, \$1·85 to \$2·10 per 100 lb.

New York,—July 21, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12c.; Grenada, 11c. to 11½c.; Trinidad, 11½c. to 12c.; Jamaica, 9½c. to 9¾c. per lb.
COCOA-NUTS—No quotations.
COFFEE—Jamaicas, 7½c. to 8½c. per lb. (ex store).
GINGER—Jamaica, 6½c. to 8½c. per lb.
GOAT SKINS—Jamaicas, 58c. per lb.
GRAPE FRUIT—\$5·00 to \$7·00 per barrel.

MACE—30c. to 35c. per lb.
NUTMEGS—West Indian, 80's, 22c. to 23c.; 110's, 15c. to 16c.; 130's, 11c. per lb.
ORANGES—\$2·50 to \$2·75 per case; \$5·00 to \$5·50 per barrel.
PIMENTO—4½c. per lb.
PINE-APPLES—4c. to 10c. each.
SUGAR—Centrifugals, 96°, 4c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—July 29, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

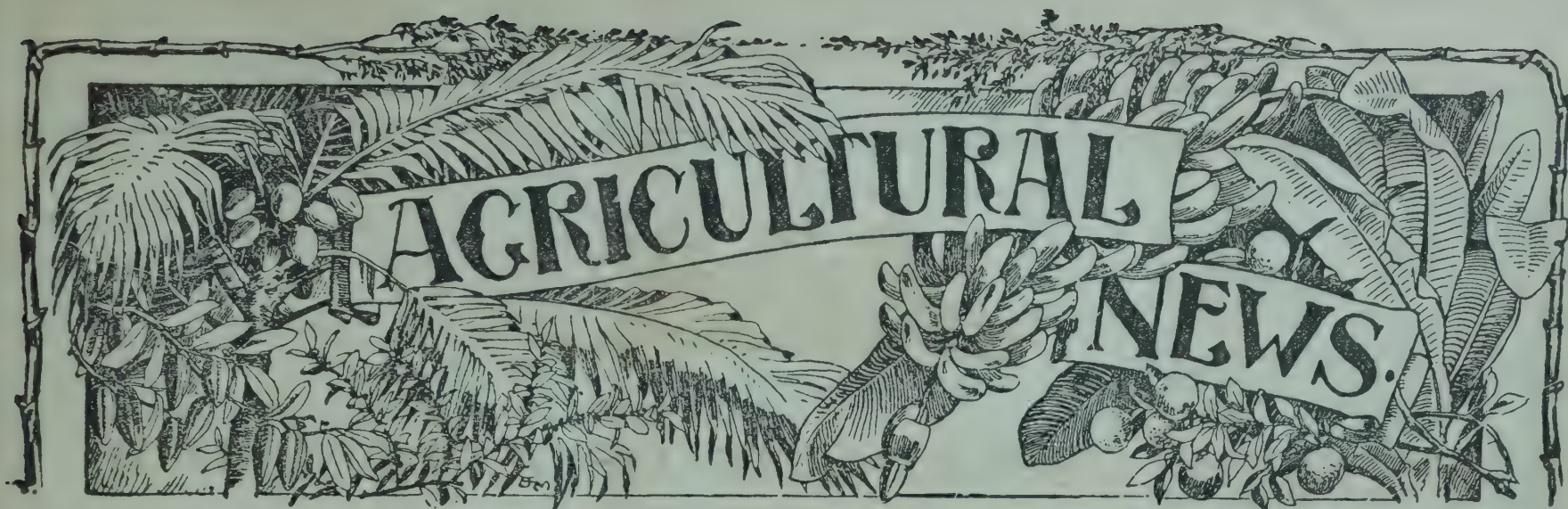
ARROWROOT—St. Vincent, \$3·50 to \$3·75 per 100 lb.
CACAO—\$11·50 to \$11·75 per 100 lb.
COCOA-NUTS—\$12·50 per M. for husked nuts.
COFFEE—\$10·50 per 100 lb.
HAY—87c. per 100 lb.
MANURES—Nitrate of soda, \$62·00 to \$65·00; Ohlendorff's dissolved guano, \$55·00; Special cotton manure, \$50·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.
ONIONS—Madeira, \$2·00 per 100 lb.
POTATOS, ENGLISH—Bermuda, \$3·66 per 160 lb. (retail).
RICE—Ballam, \$4·40 to \$4·45 per bag (190 lb.); Patna, \$3·10 to \$3·20 per 100 lb.
SUGAR—Dark crystals, \$2·25; Muscovados, 89°, \$1·75 per 100 lb.

British Guiana,—July 27, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
CACAO—Native, 12c. per lb.
CASSAVA STARCH—\$5·00 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—Rio and Jamaica, 13½c. to 14c. per lb. (retail).
—Creole, 12c. per lb.
DHAL—\$3·70 to \$3·75 per bag of 168 lb.
EDDOES—\$1·08 per barrel.
MOLASSES—No quotations.
ONIONS—Madeira, 2½c. to 2¾c. per lb.
PEA NUTS—American, 5½c. per lb. (retail).
PLANTAINS—12c. to 32c. per bunch.
POTATOS, ENGLISH—Bermuda, \$3·50 to \$3·75 per barrel (retail).
POTATOS, SWEET—Barbados, \$1·44 per bag; \$1·44 per barrel.
RICE—Ballam, \$4·20 per 177 lb.; Creole, \$3·90 per bag.
TANNIAS—\$1·92 per barrel.
YAMS—White, \$2·16 per bag.
SUGAR—Dark crystals, \$2·40 to \$2·50; Yellow, \$3·40; White, \$4·50; Molasses, \$2·50 to \$2·60 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·50 per M.

Trinidad,—July 27, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$11·00 to \$11·10; estates, \$11·50 per fanega (110 lb.); Venezuelan, \$11·00 to \$11·50 per fanega
COCOA-NUTS—\$20·00 per M., f o b
COCOA-NUT OIL—67c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 9½c. per lb.
COPRA—\$2·60 to \$2·75 per 100 lb.
ONIONS—Stringed, \$1·80 to \$2·20 per 100 lb. (retail).
POTATOS, ENGLISH—\$1·50 to \$2·00 per 100 lb.
RICE—Yellow, \$4·25 to \$4·40; White, \$4·50 to \$5·60 per bag.
SUGAR—White crystals, \$4·00; Yellow crystals, \$3·00; Molasses sugars, \$2·50 to \$3·00 per 100 lb.



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Cocoa-nut Industry in the West Indies.

IT may be of some interest to bring to the notice of the readers of the *Agricultural News* the important position occupied by the cocoa-nut industry in two of the West Indian

Colonies. The export of cocoa-nuts from Jamaica and Trinidad is an industry of considerable standing. In the latter island, moreover, the manufacture of copra has, in recent years, been extensively taken up. Cocoa-nut oil is also largely produced both for an immense local consumption and for export. The acreage under cocoa-nuts in Jamaica in 1903 was placed at 14,396; in Trinidad, in 1902, the Wardens' returns showed 14,000 acres under cocoa-nut cultivation.

The number of cocoa-nuts exported from Jamaica in the year 1902-3 was over 25½ millions, representing a value of £67,903. This industry suffered severely from the hurricane of 1903, and the trade may be expected to be slower in recovering than that in bananas. A very large number of trees was destroyed, but there has since been a large amount of re-planting, showing that confidence is still felt in this staple. There is, in addition to the exports, a large consumption of cocoa-nut oil in the island. Neither the oil nor copra, however, figures in the list of exports from Jamaica.

The important position occupied by the cocoa-nut industry in Trinidad is indicated in a note elsewhere in this issue. The number of cocoa-nuts exported during the last few years has not varied much from 10 millions. In 1895 these represented a value of about £35,000, but, owing to a serious decline in prices, the value in 1902-3 was only £17,000. Advantage has, however, been taken in Trinidad of new uses found for these nuts. The large estates are now equipped with drying houses by which the nuts can be converted into copra. In the year 1903-4 over 2¼ million pounds of this product were

exported. Further, most of the plantations are equipped with hydraulic presses for the expression of cocoa-nut oil, the exports of which are rapidly increasing. Trinidad growers have thus a choice of three markets, viz., nuts, copra, and oil. In this way the smaller nuts, unsuitable for shipping whole, can be converted into either copra or oil, according to the relative prices of the two products.

A valuable paper on the 'Cocoa-nut Industry of Trinidad' was prepared for the last West Indian Agricultural Conference by Mr. William Greig, and is published in the latest issue of the *West Indian Bulletin*.

It is calculated that, in addition to the exports, the local consumption of cocoa-nut oil in Trinidad, due principally to the large East Indian population, is about 700,000 gallons. This would represent 35 to 40 millions of nuts. The exports of nuts, copra, and oil being estimated to account for between 13 and 14 millions, it will be seen that the total annual production of nuts in Trinidad may be placed at 50 millions.

Experience in Trinidad has shown that, to avoid the heavy cost of transporting the nuts, it is essential that the copra-drying houses and oil-extracting machinery be erected where the nuts are grown. For this reason, as has already been mentioned, the principal cocoa-nut plantations are equipped with the plant necessary for producing these two products. A copra-drying house is similar to that ordinarily used for cacao. In some moist districts artificial heat will be found necessary for drying copra. In manufacturing oil from copra, the latter is placed in bags and subjected to a pressure of 2 tons to the square inch in hydraulic presses. It is estimated that 1 ton of copra will yield from 153 to 156 gallons of cocoa-nut oil.

The residue after the expression of the oil is known as cocoa-nut meal. It is a valuable feeding stuff for cattle and horses. Information as to its composition and value for this purpose was published in the last issue of the *Agricultural News* (p. 254).

In the paper referred to above, Mr. Greig urges that every cocoa-nut plantation 'should have a simple table, calculated from its cost of production and results, showing the relative values of nuts, copra, and oil, which would serve as a guide in the disposal of its products.' Such a table Mr. Greig gives in an earlier paper on this industry, published in *Industrial Trinidad*. This shows, for example, that, when nuts are worth \$10 per 1,000, the equivalent price of copra is \$67.86 per ton, and that of oil 50c. per gallon (after

allowing for the value of 5.6 lb. of cocoa-nut meal per gallon of oil).

It will thus be seen that in Trinidad the cocoa-nut industry has been placed in a staple and prosperous condition. Reference to the table of exports of Tobago, published in the *Agricultural News* (Vol. IV, p. 179) will show that this industry is also of some considerable value to that island. The value of the nuts, oil, and copra exported to Trinidad in the year 1904-5 was £2,453.

SUGAR INDUSTRY.

Central Factories at Jamaica.

Reference has been made in these columns to signs of revival of the sugar industry at Jamaica. The *West India Committee Circular* gives the following information in regard to the establishment of central factories in that island:—

In a recent issue we indicated that there was a probability of a new central sugar factory being erected in the district of Vere, Jamaica, and we are now in a position to give some particulars regarding the company which has been formed, and is about to be registered in Jamaica with this object in view. The title is 'The Vere Estates Company, Ltd.,' and the authorized share capital £100,000, in ordinary shares of £1 each, of which 70,000 are to be issued, and 6 per cent. convertible debentures to the value of £30,000. The purpose of the company is to acquire a number of estates, and to plant and cultivate sugar, cotton, and cocoa-nuts upon them, and to erect a central factory at Moreland for the manufacture of sugar and rum according to the most approved and economical methods. The estates taken over will be Raymonds, Hillside, and Moreland (sugar), Braziletto, Bogue, and Olive Park, and a portion of Chesterfield, making a total acreage of 9,556 acres, of which 1,063 are now irrigated and under cane, 2,276 available for cane and cotton, 2,180 is guinea grass and pasture, and 4,037 is wood, ruinate, and salinas.

The London agents of the company are Messrs. E. A. dePass & Co., and arrangements have been made for Mr. C. E. deMercado, the resident partner of Messrs. Lascelles, deMercado & Co., of Kingston, and Mr. Arthur W. Farquharson, to act as local directors, and to manage the company's business in Jamaica.

It is proposed to erect the Moreland factory in time for the 1907 crop, and the daily out-put of sugar is estimated at 22 tons. We understand that careful consideration will be given to the claims of the Naudet diffusion process.

The properties are contiguous, and situated on a perfectly level plain, thus facilitating cultivation on the cheapest possible scale, and economical transportation of the canes to the mill and of the finished products to the place of shipment, which is only 3 miles from the factory. The danger of injury to crops by drought has now been practically eliminated by the completion of a government system of irrigation, which is available for the whole of the 1,063 acres at present in canes. The necessary canals and trenches upon the estates have also been constructed and are in operation. Much larger crops than have hitherto been obtainable should therefore be assured.

The introduction of a system of steam-ploughing is contemplated, the soil of Vere being of extraordinary depth and friability, and very favourably reported upon by Dr. Cousins, the Island Chemist, in this connexion. The native labour supply is fairly large and is supplemented by a number of East Indian coolies.

As to the yield of cane with full irrigation, Dr. Cousins and other experts believe 30 tons per acre, on an average, to be a reasonable estimate. The company bases its calculations, however, upon an average, year in and year out, of 25 tons per acre from the irrigated fields, and of 17 tons per acre from the unirrigated. The latter figure is approximately the actual average of the past ten years on Hillside, during which period there were four droughts, one of which caused an almost total loss of crop. It will be seen, therefore, that from the 1,000 acres of irrigated land at present in cultivation on the company's properties, 25,000 tons of canes would be produced. Dr. Cousins, reporting upon the average quality of Vere juice, states that it would require 9.74 tons of canes to produce 1 ton of sugar, and 35 gallons of rum at 140° over proof. In order, however, to provide a margin of safety, the estimated production is based upon 'Watts' Table C.,' which, allowing for 75 per cent. crushing, and 88 per cent. extraction, shows 1 ton sugar from 10.10 tons of cane. Only 33½ gallons of rum, or say, one puncheon (100 gallons), to every 3 tons of sugar are calculated to be produced from the by-products.

On the above basis, 25,000 tons of cane for the first year's working should produce about 2,475 tons of sugar and 825 puncheons of rum. In succeeding years the additional cultivation of 200 acres of canes from unirrigated lands would increase the production by about 336 tons sugar and 112 puncheons of rum, in which case the factory output for the seasons commencing January 1907, 1908, and 1909, respectively, would be: 2,475 tons of sugar, and 825 gallons rum; 2,811 tons sugar, 937 gallons rum; and 3,147 tons sugar, and 1,049 gallons rum. This it is hoped further to augment by judicious planting, so as to extend the crop period.

An important source of revenue is also looked for from the extended cultivation of Sea Island cotton. The experimental planting of 45 acres at Moreland has shown most satisfactory results, both as regards the quantity produced and the quality of the cotton.

The development of the Vere district of Jamaica is receiving a further impulse from the erection of another central factory on Amity Hall estate, the property of Major H. W. Mitchell. This factory, which is to be in operation by the end of the current year, is the property of another small local company, and will manufacture the canes grown on Amity Hall estate, and also upon Perrins' estate, which has been acquired by Mr. A. W. Farquharson, under whose management the company in question will be.

The Naudet Diffusion Process in the West Indies.

A detailed account of the 'Naudet patent process for extracting and purifying cane juice,' written by Mr. Robert Harvey, M.I. Mech. E., was published in the *West Indian Bulletin* (Vol. V, pp. 96-8). Brief descriptions of the process have also appeared in the *Agricultural News* (Vol. III, p. 354, and Vol. IV, p. 130), where mention was also made of the installation of this system at 'Caroni' estate, Trinidad.

In the *International Sugar Journal* for July

there is a further article by Mr. Harvey, fully describing the process, in which he deals especially with what has been accomplished by it at two central factories in the West Indies, viz., 'Caroni' in Trinidad, and 'Fortuna' in Porto Rico. The following extracts from this article are likely to be of special interest:—

The first start was made on the 'Caroni' sugar estate, Trinidad, in the month of February. The actual results obtained fell short of what was expected owing to the megass from the first mill not being in a suitable condition for the diffusion, this three-roller mill not having a crusher to split open the cane before entering the mill nor a shredder to shred the megass as it left the mill: the extraction of juice was not complete and the dilution was too high, so that a little extra fuel was required beyond the megass for the boiler. The next year this defect will be overcome, when no doubt the factory will work through the crop without any fuel beyond the exhausted megass. As it was, however, the results of the crop were much in advance of the double crushing of the previous year—a larger quantity of sugar being produced from the same weight of canes; furthermore, at the end of the crop, the estate produced fine yellow crystals for the London market. The proprietors of the estate are satisfied that the principle of the process is correct and that, when the necessary alteration is made on the first mill, next year's operations of the Naudet process will be in every way satisfactory and will prove in every sense a commercial success.

On the estate 'Fortuna,' by sulphuring the juice in addition to the liming, and passing the juice through Philippe filters from the battery, a very fair white sugar was produced, suitable for local consumption. Given a certain purity of raw juice in good working, an equal purity in diffusion juice and syrups results. At 'Fortuna' the purity of raw juice was during the third week 84.2; purity of the diffusion juice, 84.1.

When everything was going on well at 'Fortuna' we had an extraction of 96 to 97 per cent. This year on Messrs. Hinton & Son's sugar estate in Madeira the average extraction throughout the whole crop was 95.5 per cent.: and 40 per cent. of the canes ground were Yuba or Natal canes, a very small, hard variety.

The fuel question, however, was not satisfactory owing to the machinery in the factory not being able to overtake the amount of juice produced by the battery—that is, the triple effût, vacuum pan, and centrifugals were much under the power required. The boiler installations and the furnaces were also defective, so that here again extra fuel was required beyond the megass; otherwise the process was similar to what I have described as carried on at 'Caroni.'

The following editorial note appears in the same issue of the *International Sugar Journal*:—

The writer of the article is Mr. Robert Harvey, M.I. Mech. E., who has been out in the West Indies in conjunction with Mr. Naudet to supervise the working of the process. As his firm was responsible for designing and erecting the machinery, his knowledge of all the details is obviously of a thorough character. There is no doubt that the new process has proved a success; we have examined samples of crystals resulting from it, and they are of the highest class.

It is to be hoped that it will ere long be possible to carry on this process in a factory equipped throughout with the most up-to-date machinery in all departments, in which case we shall be in a fair position to compare the new system with the other modern systems in use in Cuba, Java, and the beet sugar area of Europe.



THE COCOA-NUT INDUSTRY IN TRINIDAD.

In his pamphlet on 'Statistics of Trinidad Trade,' Professor Carmody shows that nearly 10 millions of cocoa-nuts were exported from the colony in 1903-4. Rather over one half of these went to the United Kingdom, the rest, with the exception of 135,000 to other West India Islands, going to the United States. Of copra 2,261,803 lb. were exported, and 36,715 gallons of cocoa-nut oil.

The following remarks are made on this industry:—

Cocoa-nuts are exported chiefly for the oil they contain, which is used largely in soap-making. The nuts are shipped in three forms, viz., unhusked, husked, and (after being crushed and dried) as copra. About 50,000,000 nuts are grown annually, of which only one-fifth is exported. The remainder is manufactured locally into oil, which is very largely used by East Indians. Great Britain was formerly the principal market for the nuts, but the exports to the United States are rapidly increasing, probably to supply the raw material for a new industry.

Copra is the dried white part of the ripe cocoa-nut. It is used for oil making, and is less bulky than nuts for export. It contains 65 to 70 per cent. of oil. It is also largely used in confectionery, to which it gives a characteristic agreeable flavour.

The oil expressed locally has the advantage of being prepared from the fresh nuts, which are free from rancidity. The residual meal is used locally for cattle feeding. Recently, substitutes for butter and lard have been successfully prepared from cocoa-nut oil.

CACAO IN SURINAM.

The *Consular Report* on the trade of Dutch Guiana for the year 1904 has the following note on the prospects of the cacao industry. As already mentioned, the industry has suffered greatly from the effects of the 'witch broom' disease:—

The prospects of cacao at the beginning of the year were more hopeful than during the previous year, and gave promise of a fairly good crop, but the re-appearance of the 'Versteening,' that is, hardening of the pods, reduced the crop by some 75 per cent.

The total crop amounted to 843 tons, against 2,020 tons in 1903, and 3,526 tons in 1899. The crop, which has been decreasing steadily during the past few years, reached its lowest point, since 1878, in 1904.

Though the prospects are at present very far from bright,

the trees show some improvement, and the crop picked up to the present date (June 16) is in many cases very much better than was expected some months ago.

Experiments are being made by the Government Inspector of Agriculture for combating the disease, but, so far, the results are doubtful. Unless the disease dies out, the prospects of the industry are likely to remain unsatisfactory.

CACAO AND RUBBER AT ST. KITT'S.

The following note by Dr. Watts on the efforts that are being made to establish cacao and rubber plantations at St. Kitt's is of interest. These efforts were referred to in the *Agricultural News* (Vol. IV, p. 252):—

I paid a visit to the small cacao plantation established at my suggestion by Major Mongomerie at Molineux. This I found in very good and promising order: the area planted amounts probably to between 5 and 6 acres and is being steadily increased. It appears highly probable that cacao can be successfully and profitably grown in the ravines which abound in St. Kitt's. It will, however, be necessary to establish wind-breaks and this is being done. It may be well to encourage the planting of wind-breaks prior to, and in anticipation of, the planting of cacao or other trees.

Plots of several hundred *Castilloa* and *Funtumia* trees have been established near to the cacao. These trees are making satisfactory progress, but they should be looked to at short intervals to know what conditions are favourable. Scale insects were observed attacking the *Funtumias*; these are to be sprayed without delay.

These experiments with cacao and rubber are likely to be of very considerable importance to St. Kitt's; they should continue to receive careful attention at the hands of officers of the Department of Agriculture.

WHITE EGRETS IN BRITISH GUIANA.

Mr. M. McTurk, in his Annual Report as Commissioner of the Essequibo and Pomeroon districts of British Guiana, mentions that the white egrets, which were formerly to be seen in numerous flocks, appear to have almost disappeared, and their place is being taken by a slate-coloured variety. He says:—

The plumes of the white egrets form an article of commerce and are exported in considerable quantities from Venezuela, but I am not aware that they are exported from this colony, nor have I seen any person specially engaged in shooting them. White egrets are in their best plumage and most sought after while breeding, and the parent birds being destroyed, the young ones necessarily die of starvation.

EDUCATIONAL.

Agricultural Schools.

Leaflets have been distributed in St. Lucia and St. Vincent embodying the following information respecting the Agricultural Schools in those islands. A similar school is in existence in Dominica:—

The Agricultural School was established in 1901 by the Imperial Department of Agriculture for the West Indies, for the purpose of affording a sound practical training in agriculture to a selected number of boys of about fifteen years of age, who have passed the fourth standard, or who otherwise afford evidence that they have reached a similar stage of attainments in school subjects.

SELECTION OF CANDIDATES FOR ADMISSION.

In the selection of candidates, preference is given to boys whose parents own agricultural land, or who are especially interested in agricultural pursuits. Candidates for admission must be respectable and of good conduct, and are required to pass a written examination; also to obtain a medical certificate showing that they are strong and healthy and capable of undergoing the necessary training in field.

AGREEMENT TO BE SIGNED BY PARENTS.

After a probation period of three months, boys who have satisfied the necessary conditions are formally admitted into the school on an agreement being signed by the parents or guardians undertaking that the boys should remain undisturbed at the school for a period of three or four years, until they have attained the age of nineteen years.

ADVANTAGES OF THE SCHOOL.

In addition to the educational advantages they receive, the pupils of the school are lodged and boarded as well as clothed, free of expense to their parents. Their health is well cared for by a medical officer appointed for the purpose; many forms of recreation are provided, and they are allowed periodical holidays for the purpose of visiting their homes.

Arrangements are made whereby pupils may regularly attend a place of worship on Sundays.

Admission to this school should, therefore, be regarded as a prize worthy of competition by the best boys from the elementary and other schools in the colony.

VACANCIES PROBABLE SHORTLY.

Some of the students now in the school will shortly complete their course of training and when they leave there will be several vacancies which will be filled by the first suitable applicants. Planters and agriculturists, who have boys who intend to follow an agricultural life and who would like to receive the benefit of a practical training at the Agricultural School, should write at once to the Agricultural Superintendent for any further information or send in an application for admission.

School Gardens in Germany.

The *Consular Report* on the trade of Germany for 1904 contains the following reference to the establishment of school gardens:—

Another scheme concerning gardens is at present attracting some attention in Germany, and is said to be entirely successful. As it has been found that the extended size of modern towns makes it difficult for the various schools

to obtain specimens of the local flora as illustrations in botanical instruction, various municipal gardens have been laid out for this purpose, and the schools are now supplied from time to time with the specimens they require. In some towns there exists one garden supplying all schools; in other cases such gardens have been added to the schools beyond their ordinary playing grounds. Amongst the sixty schools of Frankfort-on-Main there are thirty-one school gardens of an average size of 150 square metres, which are used for practical demonstration of various botanical developments and incidents. Besides these there exists for the time being a garden measuring about 1 hectare, in which botanical specimens are cultivated for use in the schools. But a better garden is in course of construction, provided also with special ponds for water plants and rougher parts for specimens of the Alpine flora. The most perfect school garden in Germany exists in Munich, where in all 16,990 square metres are given up for this purpose, from which not only the schools but also the academies of painting are supplied. Besides these gardens some towns also supply sufficient ground in which the school children are taught by a qualified master the rudiments of gardening during their spare time.

Trinidad.

The Annual Report of the Principal of Queen's Royal College, Trinidad, for 1904-5 contains the following reference to the teaching of agricultural science:—

Acting on the report of a committee consisting of the Principals of the Queen's Royal College and affiliated schools and the Professor of Chemistry, appointed by the College Council to consider the teaching of science at the Queen's Royal and St. Mary's Colleges, a new scheme was introduced in January 1905. The number of classes receiving instruction was increased from two to four, and the subjects of instruction were changed. The only subject taught previously was chemistry. The new scheme provides for the instruction of classes I, III, and IV in agricultural science, and of classes II and III in chemistry.

The report of the committee referred to, dated September 21, 1904, was contained in Professor Carmody's paper at the last Agricultural Conference and is as follows:—

The committee nominated by the College Council on July 7 last, to discuss and formulate a scheme in respect to the proposed teaching of agricultural science at the colleges, have the honour to report that they have unanimously agreed to make the following recommendations effecting a change in the curriculum so far as the subject of chemistry is concerned:—

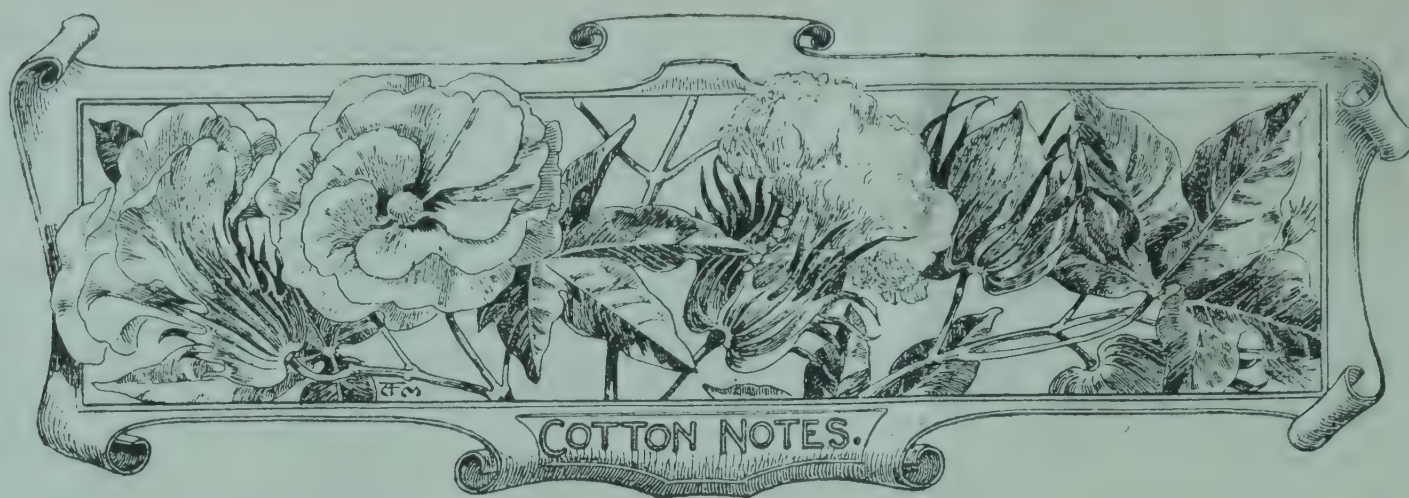
(a) That elementary agricultural science should be taught at the Laboratory one hour a week during term time to boys of class IV.

(b) That the boys of class III should receive one lesson a week for one hour in agricultural science, and one lesson a week for one hour in theoretical chemistry.

(c) That theoretical and practical chemistry should form the subjects of two lessons of one hour and a half per week for boys of class II.

(d) That two lessons in agricultural science of two hours per week should be given to boys of class I.

Hitherto, classes I and II only have attended at the Laboratory, and the instruction given has been confined to theoretical and practical chemistry.



NEVIS.

Dr. Francis Watts has reported as follows on the satisfactory position already attained by the cotton industry at Nevis:—

It is most interesting and important to note how well established the cotton industry now is in Nevis. Accurate statistical information is not yet available, but it is pretty certain that some 700 bales of lint (of 200 lb. each) have been produced in Nevis. (A small portion of this has been shipped through St. Kitt's.) This involves the simultaneous production of nearly 200 tons of cotton seed. The production of Nevis is therefore very much larger than that of any other West India Island, with the possible exception of Barbados. This is a very creditable and satisfactory position for what is practically only the second year of the industry on a commercial footing.

The price obtained for the lint grown from Rivers' seed has been satisfactory, ranging from 1s. 2d. to 1s. 3¼d. per lb. Lint from other seed has in many cases brought good prices, 1s. to 1s. 2d. per lb., while only a limited quantity has sold below 1s.

The production of this cotton has involved the circulation of several thousands of pounds amongst the labouring population, and has found employment for hundreds who found little occupation in the sugar industry. The industry has already conferred immense benefit on this little island.

The introduction of cotton has not led to any diminution in the cultivation of sugar, though, I regret to say, sugar cultivation is being curtailed in one or two places, not on account of cotton, but because it has been found unremunerative.

Cotton growing having proved distinctly remunerative, evidences of renewed activity and preparations for extending the cultivation are evident on all hands, so that, with reasonably good weather and freedom from destructive pests, I look forward to a substantial increase in the production of cotton during the coming season, particularly as cultivators are now more experienced and are likely to attain to greater uniformity and a higher level of excellence.

RATOONING COTTON.

The following is an article by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, dealing with the reasons for avoiding the ratooning of Sea Island cotton in the West Indies on account of its effect on insect pests:—

The practice of ratooning in the cultivation of Sea Island cotton in the West Indies would appear not to be desirable on general principles, and the experience of the past few years tends to confirm this opinion.

Although originally indigenous to these islands, Sea Island cotton in its present condition is an exotic. The native type is to be seen, hardy, perennial, coarse of leaf, thick of bark, resistant to disease, unattractive to insect pests or resistant to their effects, and thoroughly acclimatized. The cultivated Sea Island cotton plant is a highly specialized organism, developed with great care, and comes back to these islands as a tender annual, with thin bark, thin, delicate leaves, susceptible to disease, attractive to insects, and apparently unable successfully to combat the long drought and hot sun of the tropics.

The principal insect pests that are of importance in the matter of ratooning are the scale insects, the red maggot, the leaf-blister mite, and certain leaf-mining insects.

During the growing (or wet) season the cotton plant makes its maximum growth and comes to its period of fruiting. During the dry season very little growth is made, and it is at this time that the scale insects increase greatly in number. If there are no considerable sources of infection near the cotton fields, the scale insects will rarely become so numerous in any field during the time from the planting of the seed to the end of a first or even a second picking as seriously to affect the crop. But if, at the beginning of the growing season, very young shoots spring from a stump infested with scale insects, the case becomes serious. In addition, every plant in this condition is a menace to any young cotton that may be growing near.

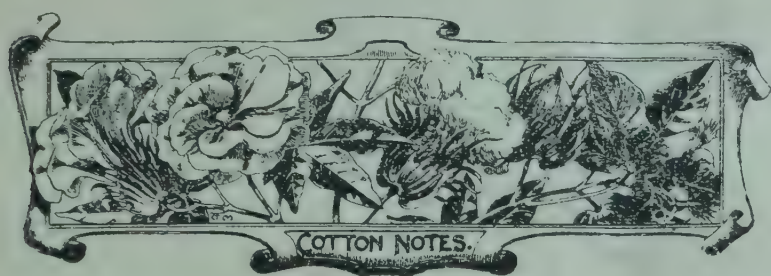
Careful examination of a number of fields of old cotton at Barbados at the end of the last dry season showed that very few plants were free from scale insects, while many were so seriously infested as to be dead or dying.

The first serious outbreak of the leaf-blister mite occurred on ratoon cotton in Montserrat, and the infestation spread to young plant cotton growing near.

The first serious case of attack of the red maggot occurred on old ratoon cotton and spread to young plant cotton near.

During the past two years a few cotton leaves have shown the tunnels of a leaf-miner which works under the upper epidermis of the leaf. The tunnel of this insect appears as a fine tracery except where there are many, then the epidermis peels off and the leaf has a characteristic coarse and wrinkled appearance. The ratoon cotton in Barbados at present shows this appearance of the leaves, and indicates that this insect is more numerous than formerly.

Clean cultivation is one of the fundamentals in dealing with insect pests, and clean cultivation in cotton growing at the present means the complete removal of cotton plants at the end of the year, and a fresh start from seed for the next growing season.



MANURIAL EXPERIMENTS WITH COTTON IN THE LEEWARD ISLANDS.

Dr. Francis Watts has forwarded the following report on the manurial experiments with cotton in the Leeward Islands. As announced in the *Agricultural News* (Vol. III, p. 237, July 16, 1904), uniform experiments were laid out in the islands of Antigua, St. Kitt's, Nevis, and Montserrat:—

On account of the drought, or from other causes, some of these experiments were not carried to a successful conclusion. Useful returns have, however, been received relating to twelve series, the mean results of which are given in the table below.

YIELD OF SEED-COTTON IN POUNDS.

Experiment No. *	Average.		
	Pounds per plot.	Pounds per acre.	Difference on no manure per acre.
1	20.31	812.4	.....
2	21.04	845.6	+ 33.2
3	21.08	843.2	+ 30.8
4	20.95	838.0	+ 25.6
5	20.62	824.8	+ 12.4
6	21.22	848.8	+ 36.4
7	19.55	782.0	- 30.4
8	19.16	766.4	- 46.0
9	20.50	820.0	+ 7.6
10	21.94	877.6	+ 65.2
11	22.04	881.6	+ 69.2
12	21.21	848.4	+ 36.0
13	18.58	743.2	- 69.2
14	19.30	772.0	- 40.4
15	21.65	866.0	+ 53.6
16	22.26	890.4	+ 68.0
17	19.34	773.6	- 38.8
18	19.07	762.8	- 49.6
19	19.24	769.6	- 42.8
20	20.38	815.2	+ 2.8
21	17.70	708.0	-104.4
22	19.70	788.0	- 24.4
23	17.65	706.0	-106.4
24	19.97	798.8	- 13.6
25	20.17	806.8	- 5.6
26	19.15	766.0	- 46.4
27	19.94	797.6	- 14.8
28	24.87	994.8	+182.4
29	20.24	809.6	- 2.8
30	20.27	810.8	- 1.6
31	17.72	708.8	-103.6
32	17.24	689.6	-122.8
33	17.50	700.0	-112.4
34	18.19	727.6	- 84.8
35	19.36	774.4	- 38.0
36	19.48	779.2	- 33.2
37	18.52	740.8	- 71.6
38	16.58	663.2	-149.2

* The list of experiments to which these numbers refer will be found in the *Agricultural News*, Vol. III, p. 237.

Owing to drought and other detrimental circumstances, the value of the information from the various plots varies. Dealing with the individual plots, perhaps more importance may be attached to the results obtained in St. Kitt's on La Guerite plots I and II, and in Montserrat on the plots at Dagenham's and White's. At these places the conditions were satisfactory and uniform, and the results were recorded with care. Mr. F. R. Shepherd, who had charge of the La Guerite plots, and Mr. C. Watson, who had charge of the Dagenham's and White's plots, both express the opinion that the manures had but little influence upon the yield of cotton.

The results of any individual plot are irregular and inconclusive, but on taking the average of all the twelve, it is seen that the irregularities tend to disappear. Satisfactory results in experiments of this kind will only be obtained by taking the average of a large number of experiments.

Dealing with the mean or average results of the twelve series, the differences are found to be strikingly small. If we assume that differences of 60 lb. of seed-cotton (equal to about 16 lb. of lint) per acre are too small to be taken into serious account, we find that only in thirteen cases out of the thirty-eight do the differences exceed this amount, and of these thirteen, six occur in the salt and sulphate of copper series, in which instances substances possibly injurious to plant life were employed in order to ascertain their effects upon insect or fungoid pests; and in these cases it is to be observed that diminished yields have occurred, indicating probably that salt and sulphate of copper both retard growth somewhat. It was not noticed that any particular immunity from disease was produced by the use of these substances. No explanation of the other seven cases of divergence from the average yield can be put forward, and it is not believed that they are related to the manures employed.

From these results we may draw the conclusion that the yield of Sea Island cotton is more influenced by season, by good soil condition and tilth than by artificial manures. At the same time it is well to remember that, while this may now be the case where cotton has been grown for the first time, it by no means follows that this will hold good in the future after cotton has been grown for some years upon the same areas.

These experiments will be repeated on somewhat similar lines for some little time to come, when it will probably be found that manures play an important part in connexion with soils which have borne a succession of cotton crops.

An interesting case occurred at Molineux, St. Kitt's, where a series of experiments was laid out. Here the rainfall is usually above the average of that of the Leeward Islands; in the season under review it was 51.5 inches for the six months July to December 1904. In this series the cotton plants grew to a very considerable size but produced so little cotton that it was not practicable to weigh it: the results have not, therefore, been included in the table. This experiment is instructive and seems to point to the fact that cotton will not produce good crops on rich lands subjected to a heavy rainfall although the cotton bushes grow luxuriantly.

The writer's present views on the manuring of cotton in the Leeward Islands are given in the *Agricultural News* (Vol. IV, pp. 182 and 198).

I desire to thank those who have assisted in these experiments, and to express the hope that they will again co-operate in similar experiments to be conducted upon the coming crop. Experiments conducted jointly by the Department of Agriculture and the planters are calculated to secure more confidence and attention than if they were conducted by the Department of Agriculture alone.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The position of the cocoa-nut industry in the West Indies is briefly reviewed in the editorial in this issue.

Information in regard to the establishment of central sugar factories at Jamaica is published on pp. 258-9. This is followed by a short article describing what has already been accomplished by the Naudet diffusion process in the West Indies.

Interest attaches to a brief note by Dr. Watts on p. 262 on the satisfactory position of the cotton industry at Nevis. This is followed by a further article on ratooning cotton. There is also published a statement of the results obtained in connexion with the extensive series of manurial experiments with cotton in the Leeward Islands.

An illustrated note on the cotton aphid and some of its natural enemies appears on p. 266. This is followed by a short note on a beetle which has appeared in some of the cotton fields. It is not anticipated that this will prove a serious pest.

Information will be found on p. 267 relative to the composition and application of sheep manure. On the same page is a note on tarpon fishing in the island of Barbuda.

On p. 269 will be found a short descriptive article by Mr. W. G. Freeman on the Dominica exhibit at the Colonial Exhibition. Though unrepresented by a comprehensive official exhibit, Dominica products are exhibited by two enterprising firms.

Price of Paris Green.

In reference to the supply and price of Paris green in Barbados it should be mentioned for the information of cotton growers and others using this article that during the present season the retail price of this insecticide has been raised from 9d. to 1s. per lb., although the principal suppliers had agreed to sell at the lower price.

The price of Paris green has similarly been raised at Antigua.

It is right to state that this rise in price is due entirely to an advance in the wholesale trade in the United States, and not to mere caprice on the part of local merchants.

Agriculture in British Guiana.

In his Annual Report as Commissioner of the Essequibo and Pomeroon districts of British Guiana, Mr. M. McTurk refers to the agricultural possibilities of the district.

In the Essequibo territory there are quantities of balata and rubber trees; upon the latter Dr. Bovalius, who has obtained a concession, reports favourably. There is very little permanent cultivation in the district. Provisions are grown, and the Indians grow enough tobacco, of which a fine quality thrives well, for their own needs. Green-heart is the only timber exported, and it is getting more and more difficult to find mature trees with the limits which the lack of transportation facilities defines.

On the Pomeroon the drawbacks to cultivation are the want of steady labour and good drainage. Coffee and cacao are now both being cultivated; machinery has been introduced for pulping the former, which is grown in considerable quantity. Many thousands of cocoa-nuts are shipped to Georgetown, and their cultivation is extending.

Trinidad Fruit Trade.

At a meeting of the Trinidad Agricultural Society held on August 8, it was announced by his Excellency the Governor that a company had been formed in England by the Royal Mail Steam Packet Company with a capital of £50,000, for the purpose of shipping fruit from Trinidad for European ports. The company would be represented in Trinidad by Mr. E. C. Skinner, the representative of the Royal Mail Company, as local director, and Mr. Frank Pink (of the firm of Messrs. William Pink & Sons) had joined the company in England.

He said that as the Royal Mail Company would have the largest share in the company, they might be relied upon to do their best for the carriage of the fruit.

The Legislative Council on August 7 passed a resolution authorizing the granting of a subsidy to this company in the form of an annual grant for a period of five years equal to 5 per cent. on the actual paid-up capital of the company up to £15,000.

It is reported that a number of banana plantations have been laid out, while, in addition, a large quantity of bananas are grown as shade for cacao.

Hints for Exhibitors at Agricultural Shows.

A small eight-paged pamphlet has been issued by the Imperial Department of Agriculture, containing 'Hints for the guidance of exhibitors at the Local Agricultural Exhibitions for Peasant Proprietors.' It furnishes brief directions as to the mode of preparation of exhibits and information as to the qualities the various exhibits should possess.

This pamphlet is likely to be found very useful by exhibitors and is being supplied to the local officers of the Department for distribution. If necessary, further copies can be obtained on application to the Imperial Commissioner of Agriculture.

Agriculture in Surinam.

According to the *Consular Report* on the trade of Dutch Guiana (Surinam), the year 1904 was a very bad one for agriculture in the colony. This was chiefly owing to the unsatisfactory condition of the cacao industry consequent on the spread of the 'witch broom' disease. A note on this industry is published elsewhere in these columns.

Attempts are therefore being made to establish new industries, among them being the cultivation of bananas for export; suckers have been imported from Jamaica and Barbados. A quantity of seed of Para rubber (*Hevea brasiliensis*) has been imported and the young trees are reported to be doing well. Up to the end of the year some 150 acres had been cleared and planted in sisal hemp. This acreage has since been considerably increased.

The rice industry has shown a considerable extension, the crop being 875 tons, against 442 and 304 tons in the two previous years.

A scientific examination is now being made into the timber of the colony, and it is hoped that this will result in a large increase in the value of the exports.

The values of the principal exports during the year were as follows: balata, £37,904; cacao, £44,837 (against £116,795 in the previous year); timber, £1,788; rum, £4,774; and sugar, £118,992. The exports of gold were valued at £91,939.

A New Source of Rubber.

What appears to be a discovery of considerable importance and one which may have far-reaching effects on the rubber industry has been made known by the publication of a report by Dr. Huber, of the Para State Museum, on Para rubber. This is referred to on p. 271.

From further information published in the *India Rubber World* it would appear that probably the market has received very little pure Hevea rubber, the product known as Para rubber being a blend of the latices of *Hevea brasiliensis* and a *Sapium* resulting from indiscriminate tapping. This new rubber tree has been identified as *Sapium Aucuparium*; it belongs to the natural order *Euphorbiaceae*, of which *Hevea* is also a genus, though widely separated. It is said to be rather a hardy tree and to grow with great rapidity. Further, its seeds are much less

delicate than those of *Hevea*. The tree is very abundant in the Amazon valley.

Apparently the product of this tree has only in a few instances been marketed alone and very little can be said definitely of its value. It is, however, certain 'that there is produced from the latex of *Sapium Aucuparium* a rubber which finds ready sale, and which, when mixed with *Hevea* latex, produces a rubber not to be distinguished from the supposed pure *Hevea* rubber.'

West Indian Bulletin.

In the new issue of the *West Indian Bulletin* (Vol. VI, no. 2) the report of the West Indian Agricultural Conference, 1905, is concluded.

The first paper contains an account of the 'Fruit Industry at Barbados' by Mr. J. R. Bovell, giving full details in connexion with the shipment of bananas and other fruits. This is followed by papers by Mr. Bovell, Dr. Watts, and Mr. Sands, summarizing the results of experiments in the cultivation of cotton in the West Indies. The fungoid and insect pests of cotton are also dealt with in short papers by Mr. Lewton-Brain and Mr. Ballou.

Among a large number of interesting and important papers in the section devoted to general subjects, special mention should be made of that by the Hon. Wm. Fawcett (Jamaica) on 'Raiffeisen Agricultural Banks.' This paper has already been published in pamphlet form with a view to its wide circulation especially among members of agricultural societies in the West Indies.

Special interest attaches to Captain Short's paper on 'Castilloa Rubber in Tobago,' and the discussion which followed. Interesting results have been obtained in these pioneer attempts to establish rubber plantations in the West Indies which should prove of considerable value to others who are proposing to cultivate rubber-yielding trees.

Another interesting paper is that by Mr. Wm. Greig on the 'Cocoa-nut Industry of Trinidad' which is referred to in the editorial in this issue. Notes on the local breed of hairy or woolless sheep are presented in a paper by Mr. W. R. Buttenshaw, to which is appended additional information which has since come to hand.

The papers in the Educational Section give a complete review of recent efforts that have been made in the West Indies to introduce the teaching of the principles of agriculture in colleges and secondary schools, to establish school gardens, and promote school shows in connexion with the teaching of agriculture in the elementary schools, and also of the efforts of Agricultural Instructors. Special reference should be made to a valuable paper read by Mr. J. R. Williams on 'Popular Agricultural Education in Jamaica,' in which it was stated that considerable improvement had been shown in the attempts to teach agriculture in the schools, as well as in the impression of agricultural education in general.

The number concludes with a discussion on the observation of Arbor Day in the West Indies.



INSECT NOTES.

The Cotton Aphis and its Natural Enemies.

The cotton aphis is a small bug with sucking mouth parts. It is very small, and sometimes occurs in great numbers, and is always worse in a dry season than a wet one. It is pale green or yellowish in colour. The body is rather pear-shaped. The eyes are dark and easily noticed. There are six legs, two antennae or 'feelers' at the front of the head, and two short, blunt tubes growing on the back.



FIG. 18. COTTON APHIS.

(*Aphis gossypii*.)

Much enlarged. Natural size indicated by hair-line.

It injures the cotton by pushing its slender beak into the leaves and sucking out the juice.

The aphis can be killed by spraying with kerosene emulsion or whale oil soap. As this insect has a mouth suited to sucking, and not to biting, such poisons as Paris green would be of no use; but as its body is soft and tender, any poison that kills by contact would be effective.

The aphis does not very often become destructive; it generally attacks young cotton, but cotton which is healthy and growing rapidly will generally out-grow the aphis attack.

It will usually be found on the very young shoots and tender leaves, large numbers of them being closely packed together. This same aphis attacks several other plants, and from these cotton may become infested.

There are two common lady-bird beetles and a lace-wing fly that feed on the aphis. One of the lady-birds is called the red lady-bird, because of the blood-red colour of its wing-covers. It is about $\frac{1}{4}$ inch long and $\frac{1}{5}$ inch wide, the general appearance being hemispherical. The front part of the body (the thorax) is shiny black with light markings looking like eyes.

The head is very small and can hardly be seen. The other is called the spotted lady-bird. It is pinkish red with black head; it has a large, black spot nearly covering the thorax, and nine black spots on the wing-covers. The legs are black. It is a little more than $\frac{1}{4}$ inch long, about $\frac{1}{6}$ inch wide, and much flatter than the other.

The eggs of these two lady-birds are very much alike, orange-red in colour, and laid in small clusters on the leaves where the cotton aphis is plentiful.

The larvae or grubs of the lady-bird are dark, with

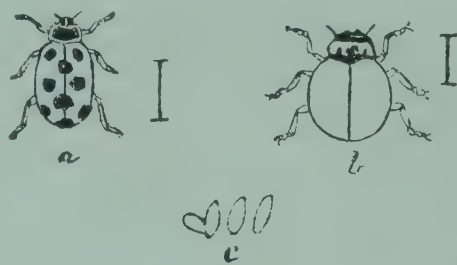


FIG. 19. LADY-BIRDS.

- a, Spotted lady-bird (*Megilla maculata*);
b, Red lady-bird (*Cycloneda sanguinea*);
c, Eggs of lady-bird, all enlarged.

light spots. They are covered with stiff hairs and short spines; the body tapers to a small point behind.

The lace-wing fly is a small, green insect with four gauzy or lace-like wings. The body is very slender, about $\frac{1}{2}$ inch long. The wings spread nearly an inch. These are very common in the cotton fields. The egg is white and is fastened to a short stalk. The larva or grub is small, pointed behind, and with two strong jaws.

These insects eat large numbers of the aphis, and do a great deal of good in keeping them in check. They should not be killed, but should be known as friends to the planter.

A Cotton-eating Beetle.

In a letter recently received at the office of the Imperial Department of Agriculture, Dr. C. J. J. van Hall, Director of Agriculture for the Dutch West Indies, makes inquiries as to the identity of a small, black beetle which is reported as attacking young cotton plants in St. Martins.

Although no specimens accompanied the letter, it seems likely that this is the species (*Hoplatrinus gemellatus*) reported in October 1904 as attacking cotton at Anguilla (see *Agricultural News*, Vol. III, p. 357). This species is widely distributed throughout the West Indies, being recorded as occurring in Antigua, Guadeloupe, St. Vincent, Grenada, Barbados, as well as in Anguilla.

The members of the family to which this beetle belongs are not generally destructive to growing plants, but the species under discussion seems to have acquired the habit of feeding on living vegetable matter, at least to a certain extent. Dr. van Hall writes that in St. Martins the stems of young cotton plants are attacked just below the surface of the ground. It is very important that cotton planters should keep a sharp look-out for any new pest, and report the appearance of any such pest to the Imperial Department of Agriculture without delay. Specimens should be forwarded whenever these are found, together with observations as to method of attack, and the nature and extent of the injury.

Fumigation of Imported Plants at Barbados.

An order was made at Barbados on August 3, 1905, by the Governor-in-Executive Committee, prescribing conditions under which all imported plants, cuttings, buds, grafts, roots, seeds, and also fruit and vegetables intended for propagation, and not for consumption as food, may be fumigated, or disinfected, or both fumigated and disinfected.

In the instructions for the guidance of officers concerned it is laid down that all such importations shall be conveyed to the place of fumigation and disinfection to be dealt with by the Superintendent of the Botanic Station, who shall decide whether the plants are to be fumigated, or disinfected, or both fumigated and disinfected.

All plants to be fumigated shall be treated with hydrocyanic gas. All plants to be disinfected shall be allowed to remain in Bordeaux mixture for ten minutes.

It is stated that the order shall not apply to any of the above-mentioned articles when imported by or for the Imperial Commissioner of Agriculture for the West Indies for scientific purposes.

It will thus be seen that Barbados has now come into line with other West Indian Colonies in the matter of the fumigation of imported plants. But the order goes rather further than similar orders in other islands in that it provides for the disinfection of plants with Bordeaux mixture. This step is designed to prevent the introduction of fungoid diseases.



TARPON FISHING AT BARBUDA.

Mr. H. Selwyn Branch, Manager of Barbuda, has forwarded for publication the following notes on tarpon fishing at Barbuda. It is hoped that the publication of this note will make the fishing of the island better known to sportsmen:—

Good tarpon fishing is to be had in this island at the mouth of a large lagoon of about 5,000 acres of water, and also inside the reef on the leeward part of the island. The tackle required is a good green-heart salmon rod with a short top joint and not less than 200 yards of tarpon line, as sometimes the fish in the first mad rush will run out 150 yards of line before he can be stopped. I find the best wire trace to use is the sixth or E guitar string with the outer wrapping taken off and one twined about 12 inches from the hook, and another at the end of the trace to which the line is attached.

A thumb guard and groin protector is also very necessary; the former must be kept wet, or the friction on the reel when the fish makes a rush will scorch one's thumb under the guard.

The bait used is the shad or silver fish about 3 or 4 inches long, which can either be used alive hooked across the back and thrown out from the boat which is anchored on the fishing ground, or put on in the ordinary way and trolled behind the boat which must not be moving more than 2 miles an hour.

It is also very necessary to prevent the bait from spinning, which it is very apt to do when a light line is used. As soon as the tarpon feels the prick of the hook, he always jumps 6 to 8 feet in the air with his mouth wide open in his endeavours to cast the deadly hook from his jaws, and in fact this he often succeeds in doing, as the mouth of the tarpon is so very large that the hook invariably only catches in the lining of the mouth. This jump is generally followed by five or six more during the first quarter of an hour, but after that he seldom jumps.

With the rod I use it takes a good hour's hard work to get the fish near enough to the boat to harpoon, but with a real tarpon rod it would be done in half that time; these rods are, however, in my opinion, too powerful for the West Indian tarpon.

There is no doubt that a certain number of these fish are to be found here all the year, as I have seen some quite small ones and several I caught lately had roe. In November, December, and January, I understand from the local fishermen, they are to be found all round the island, but during the rest of the year they are practically restricted to the two places mentioned.

SHEEP MANURE.

As a large quantity of sheep manure is used in Barbados, the following information relative to its composition and application is likely to be of interest.

Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., reports as follows:—

Sheep manure is generally used as a substitute for farm-

yard manure when the latter is deficient. It is accordingly of interest to compare the composition of the two and to note the amounts of valuable ingredients which an ordinary application of each will place at the disposal of a crop.

The following results may be taken as fairly representative:—

Barbados			
		Farmyard manure. ¹	Sheep manure. ²
Organic matter	...	19.01	32.66
Nitrogen	...	.29	1.39
Phosphoric acid	...	.28	.73
Potash	...	.30	2.07

¹ Average of seventeen samples during 1900-5.

² Average of eight samples taken by the Analytical Committee, 1905.

		Farmyard manure. 20 tons supply	Sheep manure. 2 tons costing \$14 to \$16 supply
Organic matter	...	8,516 lb.	1,463 lb.
Nitrogen	...	130 „	62 „
Phosphoric acid	...	125 „	33 „
Potash	...	134 „	93 „

The constituents of sheep manure are more rapidly available and therefore, weight for weight, more effective than those of farmyard manure, and for sugar-cane and onions I recommend, when farmyard manure is not available, an application per acre of 2 tons sheep manure.

All the facts at present available seem in Barbados to point to the desirability of making cotton the second crop of a rotation, the first crop being the sugar-cane, prior to the planting of which the land should receive the usual 20 tons of farmyard manure. In that case active chemical fertilizers are likely to prove of most value for the second crop of the rotation, namely, cotton.

If, however, special circumstances make the above course impossible and it be desired to apply sheep manure, 1 ton of sheep manure together with 330 lb. of good superphosphate would be an application most nearly in accordance with the recommendation in the *A.B.C. of Cotton Planting* and would cost from \$10.00 to \$11.00.

Mr. J. R. Bovell, F.L.S., F.C.S., writes:—

Large quantities of sheep manure are at present used in this island for canes and cotton. In the case of the canes the manure is usually applied in a long, narrow hole at the side of the cane hole a few weeks before the canes are planted.

In the case of cotton it is applied in various ways. Some planters spread it broadcast on the banks between the cane holes where the cotton is to be planted and fork it in. Others dig a small but deep hole in which they put the sheep manure and cover it over with soil, and the seed is then planted therein. Others, again, dig a small circular trench round the cotton plants and put the manure in and cover it over.

In the case of sugar-cane the results have been almost invariably most satisfactory. With regard, however, to cotton, unless the sheep manure is put in some weeks or months before the cotton is planted, its full effects do not seem to be exercised before the second picking or the ratooning of the cotton. Where sheep manure is to be used with cotton it should, I think, be applied at least two months before the cotton is planted.

Where sheep manure is to be used for onions, it is usually spread broadcast on the ground and forked in some time before the onions are transplanted.



GLEANINGS.

The attendance at the Colonial and Indian Exhibition up to Saturday July 29, since the opening day, has been 627,597. (*West India Committee Circular*.)

In reference to the note in the *Agricultural News* (Vol. IV, p. 200) on the formation of an Agricultural Society at Anguilla, it may be of interest to mention that the membership of the society has already reached fifty.

A very successful Agricultural Show was held at Newmarket, Jamaica, on August 1. The show was largely attended, and the exhibits—especially in the minor products section—were up to their usual standard.

Messrs. Henry W. Frost & Co., of Charleston, S.C., report under date July 29: 'The unsold stock of islands cotton being reduced to 90 bales, which are being held for higher prices, the market is nominal, and we omit quotations.'

A course of six lectures to teachers in elementary schools is to be given at Antigua by Mr. A. H. Kirby, B.A., Agricultural and Science Master. The lectures will deal with the subjects prescribed by the code for the teaching of elementary science.

Messrs. G. W. Bennett Bryson & Co., Ltd., of Antigua, report in regard to the sugar market: 'The Halifax refiners having expressed their willingness to take small shipments at parity of New York, the balance of the crop will be shipped to Halifax.'

We learn with pleasure that several small proprietors have been supplied with the best cotton seed from the Central Factory in quantities of from 20 lb. to 50 lb., while the large proprietors have taken their seed in thousands of pounds. (*St. Vincent Times*, August 10.)

Dr. Watts writes: 'The well-known "Baths" at Nevis are being renovated; a new bath-house and dressing rooms have been built, and the bath itself has been thoroughly cleaned and renovated. I found the temperature of the water was 170° F.' An account of the 'Bath Springs at Nevis' was published in the *Agricultural News* (Vol. IV, p. 206).

At a specially convened meeting of the Dominica Agricultural Society held on July 29, his Excellency the Acting Governor (Mr. H. Hesketh Bell, C.M.G.) read a paper on a scheme for effecting the insurance of plantations against loss from hurricanes. A resolution in favour of the scheme was carried unanimously, and copies of the paper are being forwarded to members of Lloyd's, London.

The Agricultural Superintendent at St. Lucia has notified for the information of planters and managers that several of the pupils of the Agricultural School will shortly be ready to enter situations on estates. They are about nineteen years of age and have had some four years' training at the school.

The third Colonial Products Exhibition will be held at St. George's Hall, Liverpool, from January 30 to February 8, 1906. Those colonies and firms desirous of obtaining space are invited to apply to the Joint Managers, 9, Chapel Street, Liverpool, from whom further information can be obtained.

According to the *Jamaica Daily Telegraph* of July 29, a dye-wood factory is to be established in the parish of St. Elizabeth by a British company. It is anticipated locally that the operations of this company will prove a boon to one of the best logwood-producing districts of the island, in the same manner as that in operation near Spanish Town.

In reference to the note in the *Agricultural News* on shows of colonial-grown fruit and vegetables to be held by the Royal Horticultural Society, it may be mentioned that the Imperial Commissioner has been informed that the exact dates for the next four shows have been fixed as follows: December 5 and 6, 1905; March 22 and 23, 1906; June 6 and 7, 1906; December 4 and 5, 1906.

The London correspondent of the *Port-of-Spain Gazette*, reporting a further meeting of West Indian proprietors in London to discuss the new arrangement for buying farmers' canes (see *Agricultural News*, Vol. IV, pp. 194-5), records that matters have now taken some practical shape. He states that credit is due to Mr. Norman Lamont, M.P., for his efforts to put the cane-farming industry on a sound footing.

The Secretary of the West India Committee writes: 'As a result of the Exhibition, I am receiving many inquiries for West Indian commodities, and have, during the past week, been asked to quote trade terms for swizzle sticks in any quantity and small Capsicums in bulk. If you could put us in the way of quoting, I shall be very grateful.' Communications on the above might be addressed to the Imperial Commissioner of Agriculture, Barbados.

In a review in Merck's *Annual Reports* on recent work in connexion with the use of anthrax vaccines, it is stated that inoculation does not involve the risk of serious lesions. 'The last 50,000 inoculations have been devoid of serious occurrences and losses. . . The disease was brought to a standstill where it was already established, while the prophylactic application of the serum averted its occurrence in such cases where formerly it appeared regularly.'

According to the *Port-of-Spain Gazette*, a supply of Danysz rat virus has been received in Trinidad and will be distributed gratis, on application to the Government Analyst, to any one who undertakes to use it according to the instructions and report results. This is the virus referred to in the last issue of the *Agricultural News* (p. 247); it is not the same as that imported by the Imperial Department of Agriculture (the Liverpool virus), but is used in much the same way and has a similar action.



ST. KITT'S-NEVIS: ANNUAL REPORTS ON THE BOTANIC STATIONS AND AGRICULTURAL EDUCATION, 1904-5.

Botanic Station, St. Kitt's.—Among the minor improvements effected at this station during the year may be mentioned the establishment of rockeries of succulent plants. A number of trees were planted out during the year, and on Arbor Day, which was celebrated at the station, 50 trees (mostly palms) were added to the collection.

The demand for ornamental and economic plants is on the increase. The number of plants distributed from the station during the year was 1,377; this number included 702 rubber and 579 cacao trees. References have already been made in the *Agricultural News* to the efforts to extend the cultivation of rubber and cacao in the presidency.

The rainfall for the year was 39.57 inches. This was considerably below the average, which has not been without its effect on the results in the experiment plots.

Agricultural Education.—The reports of the Head Master of the Grammar School and the Agricultural and Science Master indicate that useful work is being accomplished in connexion with agricultural education and that the scholars are taking advantage of the facilities offered them for obtaining sound scientific education along agricultural lines.

In addition to the science teaching, Mr. Belling has given practical instruction to the boys in the school garden. The latter have thus had an opportunity of becoming familiar with the details of gardening operations.

Agricultural Instructor, Nevis.—Mr. Hollings' report deals primarily with the work in connexion with the establishment of the branch station at Nevis. Considerable difficulties have been experienced in consequence of a dry season, but, in spite of this, satisfactory progress would seem to have been made.

The station is devoted almost entirely to experiments with economic plants. These included experiments with cotton and with introduced varieties of various food crops. The rainfall at the station was only 46.13 inches, and the dry season interfered considerably with the experiments.

The returns from the cultivation of cotton at Nevis appear to have been satisfactory on the whole, and the planters have not suffered, to any considerable extent, from the attacks of insects.

DOMINICA AT THE COLONIAL EXHIBITION.

The following descriptive sketch of the Dominica exhibits at the Colonial and Indian Exhibition, written by Mr. W. G. Freeman, is extracted from the *West India Committee Circular*:—

Dominica has not the advantage of a comprehensive official exhibit, gathered together by a representative local committee determined to display the products and resources of this beautiful island in an attractive manner to the British

public. Regarded purely from the point of view of a representative West Indian Exhibition, this is to be regretted, for Dominica can hold its own with any island in the West Indies, in interest and beauty, and moreover is one of those which offers special attractions to the would-be settler, who, possessed of sufficient means, is anxious to find a land to make his home.

Some idea of the resources of the island is given, however, by the exhibit of Messrs. Francis Everington & Co., of Melville Hall. A small sample of cacao and several of lime juice, both raw and concentrated, represent the staple industries. A series of starches and meals, including arrow-root, tous-les-mois, cassava starch and farine, banana meal, tannia starch (*Colocasia esculenta*), sweet potato starch, bread-fruit flour, corn (maize) starch, etc., are also shown. The spice-producing capabilities of this fertile island are indicated by samples of nutmegs and mace, ginger, cinnamon, cloves, turmeric, etc., mainly in the form of powders. As already stated, the exhibit does not claim to be representative, and several more products might have been shown; but there is sufficient even here to allow any one, acquainted with the conditions of soil and climate necessary to produce these various crops, to obtain some idea of the great natural resources of the island.

Dominica is famous for its lime juice, and it is very fitting that, owing to the enterprise of Messrs. L. Rose & Co., of the Bath and Emsall estates, in the Roseau Valley, this product is worthily represented. Their attractive and interesting exhibit, arranged near the centre of the West Indian Court, comprises photographs of lime trees in bearing, scenes of gathering the fruit, etc., samples of the raw and concentrated juice, and bottles of the finished product in the form in which it is so familiar at home. The excellent samples of otto and oil of limes will, perhaps, come to many as an agreeable surprise, and indicate other products from this most useful tropical plant. Dominica lime juice has a world-wide reputation, but curiously enough the fresh fruits themselves, although highly appreciated in the United States, are but little known in Great Britain, and there should be a good market for them. Most people who have lived in the tropics prefer limes to lemons, and doubtless others would soon learn to do so if the fruit could be imported so as to allow them to be put on the market at sufficiently low rates.

CASSAVA TRIALS IN JAMAICA.

The following are extracts from a report by Dr. Cousins on experiments with cassava in Jamaica. The full report was published in the *Bulletin of the Department of Agriculture* for July:—

To test the agricultural yield of the various cassavas now in cultivation in Jamaica, a series of $\frac{1}{10}$ -acre plots of some twenty-three native varieties was planted in April 1904. After twelve months' growth, a portion of each plot was reaped and the tubers sampled for analysis. The yield per acre is much lower than it should have been owing to a severe attack of red-spider last August. The starch content of the tubers was quite satisfactory, and most varieties were in a fit state for the use of the starch manufacturer at the end of the first twelve months.

The leading variety of the series is 'White Top' with 10½ tons tubers per acre, containing 33.6 per cent. of starch equal to 7,902 lb. starch per acre. The variety that comes next is one called 'Long Leaf, Blue Bud' yielding 6,552 lb. of starch per acre. The highest percentage of starch was found in 'Silver Stick'; this contained 35 per cent. of starch.



CULTIVATION OF TAPIOCA IN JAVA.

The following account of the cultivation of cassava and the manufacture of tapioca in Java is contained in the *U. S. Monthly Consular Reports* for April:—

Tapioca can be cultivated from sea-level to altitudes of more than 3,000 feet and can be planted at any season, but that planted near the close of the rainy season, the latter part of March, thrives best, as it requires moisture when first planted. It takes between seven and eight months to yield, so that there is no second crop in one year, as with rice. The crop is poor where there is shade, and the seed is planted on open land.

Although the best crops are had when the plant is grown in loose soil, having sufficient humus and sand, it does very well when planted in poor soil provided there is no shade. When planted in dark soil it grows well, often forming fine, large stalks, but at the cost of the roots. If planted in clay land tapioca does very poorly.

When the land is well ploughed, broken cuttings of about 1 foot long are planted about 4 feet apart. These cuttings, or slips, are taken from the middle of a plant which is moderately old, always choosing the straightest plants, and are cut flat at the top and pointed at the bottom. The plant begins to sprout about five days after being planted, and no weeding is done until the plants have grown at least a foot and leaves are beginning to form. When they are two or three months old weeding is done for the second time and earth is put around the plants. Further weeding is not necessary, as after three months the shade from the leaves keeps the weeds from growing.

Most planters leave three branches on the stem, removing the other shoots in order to keep the plant from growing too high and forming a large root stem. If allowed to grow naturally, it attains a height of 10 feet or more; in cultivation it is permitted to reach a height of only about 6 feet. In low lands, tapioca plants mature at seven and eight months, but in high lands they generally take nine months. The native planters often allow the plant to stand until a full year old. The root then becomes quite soft, but is not really harmed for the manufacture of flour. It is said, however, that a smaller amount of flour is obtained from roots over nine months old.

One great advantage of tapioca over other plants is that it is not subject to any disease and requires but little care while growing. Much damage, however, is done to the plant by wild pigs.

The harvesting of the tapioca plant is very simple. The plant is cut off near the ground and the root is dug up, peeled, and washed in running water, then rasped. The pulp is worked in a tub of water until, when it is pressed, clear water runs out. It is then pressed through a cloth stretched over a barrel, and the fluid allowed to settle for twenty-four hours, after which it begins to ferment. On the third day the water is baled out leaving the flour at the bottom, which is then taken out and dried in the sun for three days, being crumbled by hand to facilitate the drying. Some of the natives sell the wet flour to the manufactories, where it is again washed and dried in the sun or upon hot plates.

At the manufactories, most of which belong to Chinese, the process is carried on by machinery, run chiefly by water power. The principal part, the rasp, is a cylinder, 11·8 to

15·7 inches long, and 3·9 to 5·9 inches in diameter, covered with short pieces of wire. The pulp falls from the rasp into a receptacle, by the aid of a little water which is allowed to run on the rasp. The pulp then runs into the sieve, an octagonal or hexagonal cylinder, 4·36 or 5·45 yards long, covered with fine brass-wire gauze, and lying at a slope. This is turned slowly and water is kept running on it. The pulp comes out of the lower end while the flour goes through the gauze with the water and is taken to the settler. It is then stirred and settled for a second time, then dried and crumpled by hand in the sun. Afterwards it goes to the drying ovens, where great care must be taken not to overheat the plates and burn the flour.

After the flour is well dried it is divided into two sorts according to colour and grain. The first quality consists of a fine, white flour, the second quality being slightly coloured and of a rougher grain. There is also an intermediate quality made by the natives. It is calculated that 816 lb. of the root produce 136 lb. of flour.

Prices realized in the past year were as follows, per 136 lb.:—First quality, \$2·01; second quality, \$1·81; third quality, 90c.

The finest quality of flour is exported to the United States and Great Britain. During 1903 some \$80,000 worth was exported to the United States. The total amount exported that year was 25,053,104 lb. The tapioca root is also used by the natives and Chinese as food, and sells at about 1c. per plant on the field.

CASSAVA CULTIVATION AT ANGUILLA.

As previously mentioned in the *Agricultural News* (Vol. IV, p. 200), the newly formed Agricultural Society at Anguilla is devoting attention to the cassava industry. The Secretary of the society has forwarded the following information in this connexion:—

There are two varieties of bitter cassava grown in the island, the 'Jacquelot' or 'white stick' and the 'black stick.' The 'white stick' is inferior to 'black stick,' but can be grown in poor land which will not produce the 'black stick.'

The average yield of roots per acre is placed at 29,040 lb. for the 'black stick.' This estimate is arrived at by calculating the plants 3 feet by 4 feet apart, and a yield of 8 lb. from each plant. Eight pounds appear to be a very safe estimate. Many of the members spoke of 15 lb. to the plant, and one who has had long experience as a planter said that he had seen the yield increased to 30 lb. per plant by the use of rotted cotton seed as a fertilizer.

The length of time taken to mature is ten to twelve months for 'black stick' and six months for 'white stick.'

The probable area of land available for cultivation was estimated at three-fourths of the total arable land in the island, and it was thought three-fourths of that would grow the 'black stick.'

DEPARTMENT NEWS.

Mr. F. A. Stockdale, B.A., arrived from England on August 15 and assumed his duties as Mycologist and Lecturer in Agricultural Science on the staff of the Imperial Department of Agriculture in succession to Mr. L. Lewton-Brain, B.A., F.L.S.

Mr. Thomas Jackson arrived from England by last mail and proceeded to Antigua to assume the duties of the Curatorship of the Botanic Station.

WEST INDIAN PRODUCTS.

Canada.

The following report, dated July 10, 1905, on West Indian produce in Canada has been received from Mr. J. Russell Murray:—

SUGAR.

Since my last the market has steadily declined for all grades of West Indian sugar; offerings have been more than could be utilized, which has afforded full opportunity for low counter bids. The stocks of muscovado have been far in excess of actual needs. To a large extent the congestion of the muscovado market has been caused by over consigning to Halifax. Under an agreement between consignees and refiners, the latter had to take up, pro-rata, these supplies at 10½c. above New York quotations, this year the supplies have been far in excess of the requirements and overloading has resulted, compelling the refiners to cancel the arrangement to protect themselves. Under these auspices consigned muscovado is not likely to find as ready a market as formerly. It has already been pointed out in the past that the best results are not to be obtained by such indiscriminate consigning, as it only destroys the possibility of growers obtaining the benefits of the preferential tariff. In 96° centrifugals the position is better, as few of these are consigned. Grey crystals are offered at 2½c., c. and f., without buyers, who continue to hold off and little business is being done. Prices show no indications of improvement, rather the reverse.

MOLASSES.

There is no anxiety to secure further supplies, as buyers are confident that lower prices will rule before the summer closes. Supplies from the Northern Islands have been arriving at Halifax, and are reported as being of good quality.

COCOA-NUTS.

Business is very quiet, and ample supplies are available. New York quotations still remain low, and prices locally are somewhat lower.

SPICES.

The market continues steady at late rates. Pimento is unchanged. Nutmegs, slightly higher. Ginger, unbleached, unchanged.

LIMES.

During the last ten days the weather has been warm, and prices have advanced sharply in sympathy with lemons, which have been higher in price than for three years.

RUBBER INDUSTRY IN PARA.

The *Consular Report* on the trade of Para for 1903-4 has the following interesting note on the rubber industry. The Consul deals especially with the alleged adulteration of Para rubber:—

The immediate future of the Brazilian rubber industry is exceedingly encouraging, so much so that a period of general commercial prosperity seems to be assured for several years to come.

The director of the local Botanic Gardens reports in the 'Bulletin of the Para Museum,' dated December 1904, but published in May 1905, that it has been recently discovered by a person unconnected with the production of rubber that a latex obtained from a tree entirely different from the

Heveas has been employed not only to adulterate rubber, but even in some cases to replace it altogether. Experienced estate owners believe the substitute to be slightly less elastic than the genuine article. It seems that the great demand has led to the practice for some years past. The trees in question are plentiful and exist over a very wide area, and are known in the State of Amazonas by the name of 'Tapuru' and in the neighbourhood of Para as 'Murupita,' 'Seringa-Rana,' etc. Botanists are of opinion that these trees belong to a species of *Sapium*.

The word 'Tapuru' is the Indian name for an insect, and is given to the trees because they are frequently destroyed by termites, particularly when tapping has been performed by unskilful hands. The advantages of the 'Tapuru' and its congeners consist in their being more plentiful than the 'Heveas' and in their more rapid reproduction.

Dr. Huber, the author of the report referred to, questions if the practice, which he says has passed unnoticed for twenty years, can be described as fraudulent. He considers that if the union makes no difference to the manufacturer, then no harm is done; and, on the other hand, the knowledge is gained that the sources of supply are greater than was formerly known.

Exporters state that the adulteration is detected by manufacturers by means of chemical analysis, and that the cutters here can detect the presence of an adulterant by the oedematous nature of the product, which leaves an impression when a finger nail is pressed into it. They describe the blend as 'bastard rubber,' and classify it with coarse grades. It is possible, however, that the mixture, up to a certain point, may defy detection.

BALATA IN BRAZIL.

In the following note, extracted from the *Consular Report* on the trade of Para for 1903-4, the subject of species of balata is discussed. It would appear that the species in Brazil is different from that in British Guiana and Trinidad, but the product, if properly cured, is claimed to be just as good:—

In recent years a debatable question has arisen on the subject of balata. Practical men with experience in balata, bleeding in the Guianas maintain that the same kind of tree as that which provides this gum in the Guianas exists near the city of Para. Local merchants were sceptical, but nevertheless they sent the produce to London for trial. The prices realized indicated that the Para balata was inferior to the general article. The Director of the botanic section of the Para State Museum is endeavouring to elucidate the point. In the 'Bulletin' of the Museum he describes various Amazonian species that produce balata, and is of opinion that, with improved methods of curing, it may equal the best balata of commerce. He further states that the trees are plentiful and are to be met with in the entire valley of the Amazon. He reports that the Brazilian and Guiana species are very similar, but that a precise comparison is impossible at present as both countries possess several varieties that have not yet been sufficiently studied and authoritatively described.

The export of the produce of the 'Massaranduba' is not a novelty, for in a report published by the Bureau of American Republics on the trade of Para in 1891, it is stated that Para exported gutta-percha to the United States, and explained that it was derived from 'Massaranduba' (*Mimusops elata*) and 'Jacqua' (*Lucuma gigantea*).

MARKET REPORTS.

London,—August 3, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 28, 1905; and 'THE PUBLIC LEDGER,' July 29, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 18/- to 50/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
 BEES' WAX—£8 2s. 6d. to £8 15s. per cwt.
 CACAO—Trinidad, 55/- to 62/- per cwt.; Grenada, 48/- to 52/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.
 COTTON—West Indian, medium fine, 6.55d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—Jamaica, 4/- to 6/- per bunch.
 ORANGES—Jamaica, 17/6 to 19/- per box.
 PINE-APPLES—Jamaica, 10d. to 1/- per pine; Antigua, 16/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, ordinary to good ordinary, 42/- to 45/- per cwt.
 HONEY—18/- to 30/- per cwt.
 ISINGLASS—West Indian lump, 2/3 to 2/7; cake, 1/2 to 1/4 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £16 10s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/7 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair to good pale, 1/3 to 1/4; fair red, 1/2 per lb.
 NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.
 NUTMEGS—64's, 1/4; 85's, 11d.; 101's, 7d. per lb.
 PIMENTO—2½d. to 2½d. per lb.
 RUM—Demerara, 1/2 to 1/4 per proof gallon; Jamaica, 2/1 per proof gallon.
 SUGAR—Yellow crystals, 17/6 per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 12/- to 15/- per cwt.
 SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—July 10, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

BANANAS—No quotations.
 COCOA-NUTS—Jamaica, \$22.00 to \$24.00; Trinidad, \$19.00 to \$21.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 LIMES—Jamaica, \$6.00 per barrel.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 33c.; Antigua, 28c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 20c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 4½c. to 5c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey crystals, 96°, \$2.50 to \$2.75 per 100 lb.
 —Muscovados, 89°, \$2.00 to \$2.25 per 100 lb.
 —Molasses, 89°, \$1.75 to \$2.00 per 100 lb.
 —Barbados, 89°, \$1.85 to \$2.10 per 100 lb.

New York,—August 4, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12c.; Grenada, 11¼c. to 11½c.; Trinidad, 11½c. to 12c.; Jamaica, 9½c. to 9¾c. per lb.
 COCOA-NUTS—Jamaica, \$24.00 to \$26.00; Trinidad \$23.00 to \$24.00 per M.
 COFFEE—Jamaicas, 7½c. to 8¾c. per lb. (ex store).
 GINGER—Jamaica, 8½c. to 11c. per lb.
 GOAT SKINS—Jamaicas, 57c. to 58c. per lb.

GRAPE FRUIT—\$5.00 to \$7.00 per barrel.
 MACE—30c. to 35c. per lb.
 NUTMEGS—West Indian, 80's, 22c. to 23c.; 110's, 15c. to 16c.; 130's, 11c. per lb.
 ORANGES—\$2.50 to \$2.75 per case; \$5.00 to \$5.50 per barrel.
 PIMENTO—4¾c. per lb.
 PINE-APPLES—6c. to 15c. each.
 SUGAR—Centrifugals, 96°, 4½c. to 4½c.; Muscovados, 89°, 3½c. to 3½c.; Molasses, 89°, 3½c. to 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—August 12, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.50 to \$3.75 per 100 lb.
 CACAO—\$11.00 per 100 lb.
 COCOA-NUTS—\$15.00 per M. for husked nuts.
 COFFEE—\$10.00 to \$11.00 per 100 lb.
 HAY—87c. per 100 lb.
 MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$50.00; Special cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 ONIONS—Madeira, \$3.00 to \$3.50 per 100 lb.
 POTATOS, ENGLISH—Bermuda, \$3.66 per 160 lb. (retail).
 RICE—Ballam, \$4.40 per bag (190 lb.); Patna, and Seeta, \$3.10 to \$3.20; Rangoon, \$2.50 to \$2.55 per 100 lb.
 SUGAR—Yellow crystals, \$4.25; Muscovados, 89°, \$1.80 per 100 lb.

British Guiana,—August 10, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
 CACAO—Native, 12c. per lb.
 CASSAVA STARCH—\$5.00 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Rio and Jamaica, 13½c. to 13¾c. per lb. (retail).
 —Creole, 12c. per lb.
 DHAL—\$3.60 to \$3.75 per bag of 168 lb.
 EDDOES—80c. to \$1.20 per barrel.
 MOLASSES—No quotations.
 ONIONS—Madeira, 2½c. to 3c.; Tenerife, 1½c. to 2c. per lb. (retail).
 PEA NUTS—American, 5½c. per lb. (retail).
 PLANTAINS—28c. to 40c. per bunch.
 POTATOS, ENGLISH—Bermuda, 2c. to 2½c. per lb. (retail).
 POTATOS, SWEET—Barbados, \$1.68 per bag; \$1.68 per barrel.
 RICE—Ballam, \$4.20 per 177 lb.; Creole, \$3.90 per bag.
 TANNIAS—\$2.28 per barrel.
 YAMS—White, \$2.28 Buck, \$2.16 per bag.
 SUGAR—Dark crystals, \$2.40 to \$2.50; Yellow, \$3.40; White, \$4.50; Molasses, \$2.50 to \$2.60 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—August 10, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, \$11.10 to \$11.25; estates, \$11.20 to \$11.50 per fanega (110 lb.); Venezuelan, \$11.25 to \$11.60 per fanega.
 COCOA-NUTS—\$20.00 per M., f o b
 COCOA-NUT OIL—67c. per Imperial gallon (casks included).
 COFFEE—Venezuelan, 10c. per lb.
 COPRA—\$2.60 to \$2.80 per 100 lb.
 ONIONS—Stringed, \$2.00 to \$2.20 per 100 lb. (retail).
 POTATOS, ENGLISH—\$1.30 to \$2.25 per 100 lb.
 RICE—Yellow, \$4.25 to \$4.50; White, \$4.50 to \$5.60 per bag.
 SUGAR—White crystals, \$4.00; Yellow crystals, \$3.00; Molasses sugars, \$2.50 to \$3.00 per 100 lb.



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Shipping Cotton.

UNIFORMITY in the quality of the yarn produced in the spinning factory is one of the chief aims of the spinner. He finds it ruinous to produce different qualities and have to sell them as the same grade; yet, unless he can buy raw

material with uniform qualities, it is impossible for him to do otherwise. The quality of the lint produced on different estates, even in one island, varies. In order, therefore, to maintain a uniformity in his product the spinner always purchases 'crop lots,' namely, the whole production of an estate, and only occasionally purchases odd bales at a lower price. When buying odd bales, he has to be very careful to see that the cotton is fairly uniform in quality, whereas, when buying the whole production of an estate, he may expect with some confidence that the quality will be of a fairly uniform character.

It will therefore be readily understood that in requesting the Imperial Commissioner of Agriculture to publish in the *Agricultural News* a recommendation to cotton growers in the West Indies to avoid the shipment of cotton in small lots, the British Cotton-growing Association has in view the interests of both the spinners and the growers. It is pointed out that some growers are shipping even 1 or 2 bales by consecutive mails; these should rather have been kept back until 5 or 10 bales were ready for shipment, which could then be sold as 'crop lots.'

Reference has already been made to this matter in these columns; in the issue of February 11 last it was stated: 'We desire to impress upon cotton growers the desirability of avoiding the shipment of odd lots of cotton. Not only is it difficult for the brokers to effect the sale of these, but low prices are likely to be the result.' This point was also emphasized by Mr. E. Lomas Oliver in his address at Barbados published in the *Agricultural News* (Vol. III, p. 359).

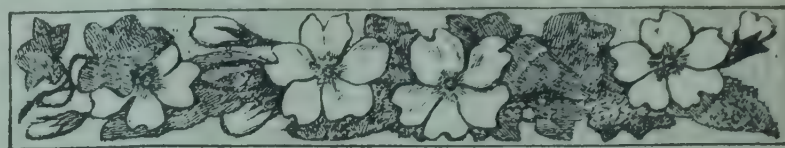
Not only, it should be remembered, does such action as has been referred to above entail a large amount of extra work in grading (which must become an impossible task as the exports from the West Indies increase), but it also causes the growers to obtain a lower price. Independent proofs of this are furnished by the Sea Island market reports, published from time to time in the *Agricultural News*, which show that 'crop lots' realize as much as 4c. per lb. more than odd bales.

It is also desired to urge shippers not to pack different qualities of cotton in the same bag, even though these may be divided by canvas. This is frequently done with the cotton that remains over from different growers after full bales have been made up. Fine spinners have a great objection to the slightest suspicion of mixture. If, therefore, more than 100 lb. remain over from a planter's crop, but not sufficient for a whole bale, it should be shipped in a small bale; if a planter has less than 100 lb., he should hold it over and send it with next year's crop.

Another important point in connexion with the shipment of cotton is the marking of the bales. It is most desirable that all the cotton shipped under a particular mark should be of the same quality. On this point Mr. Oliver said: 'Those planters who intend producing a really good quality of cotton should put their names, or the names of their estates, upon the bags containing their first-grade cotton, and some other distinguishing mark on their second grade. In our trade if the cotton of a certain mark has been found to yield satisfactory results, the spinner will look out with interest for the same mark of cotton again, and in two or three years that planter, if he keeps up a regular standard quality, will have established a name which will prove a very valuable trade asset.'

It is for this reason most important for growers to avoid shipping ratoon cotton under the same mark as their first-crop cotton, if they desire to maintain the reputation their first shipments have made. For the results during the present season certainly tend to show that the quality of ratoon cotton is inferior to first-crop cotton.

There are still many growers who have not yet realized the importance of sorting their seed-cotton. All stained, soiled, or inferior-looking cotton must be separated from the general crop and shipped as such, otherwise the appearance and quality of the first grade will be lowered, and that mark must take a second place on the market.



SUGAR INDUSTRY.

St. Kitt's.

In reporting to the Imperial Commissioner of Agriculture on a recent visit to St. Kitt's, Dr. Watts makes the following interesting statement in regard to the improved prospects of the sugar industry and the cultivation of new varieties of seedling canes in that island:—

The sugar crop of St. Kitt's has been a satisfactory one during the past year, and the prospects for the future are very favourable. On all hands one hears good accounts of several of the new varieties of canes, particularly B. 147, which has been most usefully employed in ridding certain districts of fungoid attacks, at the same time giving eminently satisfactory yields of sugar. B. 208 also finds favour in the eyes of many planters, having given in one instance over 4 tons of muscovado sugar per acre, as already noted in the *Agricultural News* (Vol. IV, p. 194). D. 116 is also favourably regarded by some.

The opinion is freely expressed that the island has benefited in a very large degree from the introduction of new varieties of canes. There is little doubt that the practice of placing experiment plots in the hands of planters upon the estates themselves has had an important effect in bringing the canes under the actual notice of the planters and enabling them to form their own judgement upon them in addition to the opinions expressed in reports. Influences other than the reports have thus been steadily and beneficially at work.

The prospects of St. Kitt's appear very encouraging; sugar has been remunerative during the past year, and the young crop has a promising appearance. The interest taken in new varieties of canes tends in the direction of progress, and will assist in protecting against future attacks of cane pests and dangers of that nature.

West Indian Seedling Canes in Queensland.

A recently issued report by the Director of the Experiment Stations in Queensland on experiments with new varieties of canes shows that good results were obtained from several West Indian canes. The results with these are given in the following table:—

Variety.	Total solids. Per cent.	Beaumé Degrees.	Sucrose in Juice. Per cent.	Quotient of Purity.
B. 208	18·0	10·1	17·48	97·1
D. 145	14·2	8·0	10·93	77·0
B. 147	17·2	9·7	15·29	88·8
D. 306	17·3	9·8	13·53	78·2
D. 116	17·3	9·8	15·87	91·7

The cane, of all those experimented with, which gave the highest percentage of sucrose and the highest quotient of purity was B. 208.

Martinique.

The *Consular Report* on the trade of Martinique 1904 reviews the position of the island's sugar industry as follows:—

The export of sugar during the year was 23,938 tons, valued at £234,355, being 5,097 tons less in quantity, and £74,375 less in value, than the shipments made in 1903. If we except the crop of 1892, the year after the great cyclone, this is the smallest output for any one year since 1855.

The year was a bad one for the local sugar industry, and consequently for the colony, which is almost wholly dependent upon it. Very few factories were able to pay a dividend, owing to the low prices of sugar. Three were closed during the year, viz., St. Jacques, Trinité, and Trois Rivières. The first two were seized and sold by the mortgagees at a heavy loss, and will no longer be worked. The third has changed hands and will resume grinding in 1906.

During the year 1,509,276 gallons of rum, valued at £97,849, were exported, as against 1,947,299 gallons, valued at £124,596, in 1903, a decrease in quantity of 438,023 gallons, and in value of £26,747. This is the smallest quantity exported from Martinique in one year for the last twenty-seven years, and shows a great falling-off from the figures of the 'eighties' and 'nineties,' when from 2,000,000 to over 4,000,000 gallons were exported annually. The industry is undoubtedly in an unsatisfactory condition, which is all the more to be regretted as the sugar factories in most cases themselves distil their molasses, and are thus deprived of what ought to be a valuable help towards tiding over the sugar crisis.

The rum distilled from the cane juice and known as 'grappe blanche,' is admitted by connoisseurs to be far superior in flavour and aroma to the 'rum industriel,' which is made from molasses. Yet the 'grappe blanche' obtains a lower price in the French market than the 'rum industriel.' The reason of this is alleged by the buyers to be that the former does not keep. This explanation is rejected by the Fort-de-France Chamber of Commerce.

TRINIDAD CACAO INDUSTRY.

The following information is extracted from Professor Carmody's pamphlet containing 'Statistics of Trinidad Trade,' referred to on p. 248 of this volume of the *Agricultural News*:—

Trinidad cacao has a very high reputation in the world's markets. As exported, the beans have undergone a process of fermentation and subsequent drying in the scorching tropical sun or by artificial heat. The keeping qualities of Trinidad-cured cacao are remarkable. It undergoes a further process of manufacture in the importing countries, and is usually sold: (1) with portion of the fat extracted; (2) with the addition of starch (prepared cacao); (3) with the addition of sugar (chocolate).

The sale of chocolate confectionery has increased enormously in recent years, and the general consumption of cacao is increasing every year.

Trinidad cacao is now exported to the United States to a much greater extent than to Great Britain or France, which were previously the principal markets.

The cacao and chocolate made in the colony contain all the fat (50 per cent.) natural to the cacao bean, and without any admixture of starch or sugar. Cacao butter is not a local production, but a by-product in the manufacture of the first type of cacao referred to above.

TOBACCO CULTIVATION IN CUBA.

The following information relating to the growing of tobacco in Cuba is extracted from the *Monthly Summary* of the U. S. Department of Commerce and Labour for May:—

The tobacco crop is grown from nursery or transplanted plants. These plants are raised in seed beds located and prepared with great care and protected, as far as possible, from insects. The seeds are very small, much smaller than hay seeds, and while there are between three and four hundred thousand in 1 oz., the seed coat is so hard that only about 75 per cent. of the seeds will sprout. On this basis, 1 oz. of seed ought to produce between 30,000 and 40,000 plants, costing the planter in the neighbourhood of \$1.50 per thousand. The seed beds and seeds having been carefully prepared, the seeds are sown in September, and in from six to seven weeks, when the young plants are from 8 to 10 inches high, they are ready for transplanting. This is done with the greatest care, as a very slight injury will kill them, and they are set out from 12 to 18 inches apart in furrows. The distance between the latter varies from 2 to 3 feet. It is said that tobacco grown under shade trees is of better quality than that grown in the open. The plants are planted by hand and not by machine, as in many parts of the United States, and the operation is necessarily much slower.

It requires about four months for the plants to reach maturity, so that the harvest is in January. During this interval they require the greatest care to protect them against the tobacco worm and other insects and against weeds. From time to time, and especially after rains, they are cultivated, the buds, or top, and all suckers as they appear are removed, and every precaution taken to ensure the full development of the leaf.

The pruning is done with the thumb nail, as its dull edge closes the wound and prevents bleeding. According as the plants are topped high or low, there will be from eight to ten or from eighteen to twenty leaves on a stalk. As soon as the leaves have ripened, the cutting begins. Each stalk is cut in sections having two leaves on each; they are hung on poles and carried to the drying sheds. A section of each stalk with a good strong sucker on it is left in the field, from which a second, or what is called a sucker crop, results, and while the quality of this crop is not as good as the true crop, it answers very well for fillers.

The drying or curing process continues for three or four weeks or even longer. During this period 'great attention must be given to the moisture, temperature, and ventilation of the drying house in order to produce those changes which characterize cured tobacco of a superior quality.'

Sweating or fermentation follows the curing, and it is to this that the tobacco owes its peculiar flavour. During or after this process the leaves are sprayed with water or a petuning liquid which is supposed to give the leaf a darker colour and a better flavour, but this is questioned by some tobacco manufacturers. When fermentation has taken place, the leaves are sorted and made up into bundles, and these into bales of about 50 kilograms (110 lb.) each. The tobacco is now ready for transport to market.

The quality of Cuban tobacco is world renowned, more especially that known as Vuelta Abajo, which is used in the manufacture of the finest cigars. To what this is specially due will probably be known when the soils in which it has been cultivated shall have been carefully analysed and compared, and the chemical changes due to curing and fermentation are better understood.



WEST INDIAN FRUIT.

BANANA INDUSTRY OF THE CANARY ISLANDS.

The following interesting review of the Canary Islands banana industry is extracted from the *Consular Report* for 1904:—

It will be remembered that there was a smart fall in the value of bananas about a year ago. Notwithstanding this, however, in the year under review there were 168,853 crates, or about 4 per cent., shipped in excess of the quantity exported in 1903, the estimated value of the shipments being £384,285 in 1904, against £375,851 in 1903. It will thus be seen that, in spite of adverse factors, the cultivation of bananas in these islands continues to be a lucrative industry. It is obvious that to be able to face a fall in price of some 50 per cent., as was the case in May 1903, and yet to increase their shipments the following year, the growers must previously have been realizing extremely large profits. The former vaticinations of ruin arising from the competition of the West Indian fruit are now no longer heard, and the farmers appear to have realized that it has produced, on the contrary, a markedly beneficial effect on the banana industry of these islands.

A factor which has enabled the growers to maintain exports at a high figure is the increased competition for freights among the steamship lines. This has brought about further reduction in the rates. While this material reduction in freights has, in a measure, contributed towards maintaining prices still paid to growers, it is apprehended that it will no longer be able to do so from the moment that still larger quantities of West Indian bananas are poured into the markets of the United Kingdom. It is reported that the quantity of West Indian bananas expected to arrive in the United Kingdom will be at the rate of 300,000 bunches per month, or a total per annum of 3,600,000 bunches, and this flooding of the markets seems bound to have a prejudicial effect on the Canary trade.

It may be remarked that the chief fears for the future of the banana trade arise from the neglect to provide more reservoirs for storing water for irrigation purposes, and also from the false economy practised by some of the planters. They have been accustomed to making large profits in the past, and now, when the prospects are not quite so brilliant, they are economizing expenses in cultivation. Economy in manure and artificial fertilizers is bound to result in deterioration of the fruit, and when it is remembered that it is by its quality alone that the Canary banana holds its place in the British market, it is easy to foretell disaster, if false economy of this kind were to become more general.

WEST INDIAN FRUIT IN LONDON.

The following note is extracted from the *West India Committee Circular*:—

Jamaica has been showing some exceptionally fine oranges and grape fruit, and the oranges on view in the Trinidad Court (especially the seedless variety), likewise several fine bunches of bananas, have attracted considerable attention. Some bunches of the Barbados 'Dagger' bananas have also made a creditable show. Spare parcels of all sorts of fruit have been eagerly bought up. It is gratifying to mention that six cases of Jamaica and Trinidad oranges were accepted for the farewell luncheon given at Westminster Hall on Saturday last to Admiral Caillard and the officers of the French Navy, in response to an offer made to the Committee, which was composed of such distinguished and well-known personages as Viscount Churchill, Major Evans Gordon, Sir Arthur Hayter, and Sir Benjamin Stone.

The *Westminster Gazette* of June 6 has the following note on Jamaica oranges:—

The quality of the thin-skinned, delicious Jamaica orange is at last being appreciated at its true worth by the public. Although by no means a pretty fruit, it is the highest-priced orange of its class on sale, and the retail fruiterers are in some instances putting up the dainties in punnets and selling them at 1s. 6d. a punnet of six fruits. The great orange shortage has had much to do with the high prices that are ruling. The supplies for the past week were 5,000,000 oranges less than those of the corresponding period last year. At the present time about seven different sorts of oranges are obtainable. In the markets the highest grade of Jamaica oranges in cases of 150 fruits commanded a guinea a package. At this price the golden fruits yield large profits to planters.

Goat Keeping. Water for goats is a most important matter, but often neglected. A cow will quench her thirst at any filthy pool or pond, but not so with goats. They are most fastidious. Clean, fresh water should always be offered twice daily, and oftener during very hot weather; but clean it must be. If a goat drinks well it invariably milks well. Salt is another important matter. It is equally as necessary to goats as it is to us with our food, and moreover it incites thirst, which means that more water will be drunk. There is no animal more wasteful in feeding; once they have soiled food in any way they will not afterwards touch it. Grass should therefore always be given in a rack. (*Journal of the Jamaica Agricultural Society.*)



PREVENTING DECAY OF RIPE FRUIT.

An article in the *Journal of the Board of Agriculture* (London, August 1905), entitled 'A method of preventing the rapid decay of ripe fruit,' is of particular interest to growers of tropical fruits. The following are extracts from this article:—

A careful examination of ripe fruit from the West Indies, intended for exhibition at the Crystal Palace in connexion with the Colonial Exhibition, showed very clearly that the decay of such fruit as mangos during the voyage was due entirely to mouldiness and fermentation set up by fungi and bacteria that were present on the surface of the fruit before shipment, and not to an inherent tendency on the part of the fruit to decay or to become over-ripe.

It is common knowledge that the decay of ripe fruit originates from bruises or wounds on the surface and thence rapidly spreads both internally and over the surface. Unfortunately, it is not so generally known, although equally true, that the decay of the bruised or wounded part is entirely due to the presence of the germs of fungi or bacteria, which develop rapidly, feeding on the sugar or other substances liberated from the bruised tissue. Fermentation and decay follow and quickly spread from one fruit to another.

Similar treatment might be applied with advantage to certain tropical fruits that do reach us in fairly good condition, as bananas, where too frequently the unsightly and injurious blackened 'skin,' caused by an external fungus, could be easily prevented. Apples, pears, oranges, lemons, etc., would also repay similar treatment.

The method of treatment described below is very simple, inexpensive, and perfectly free from danger.

In the case of fruits where every part is eaten, as strawberries, etc., the fruit should be immersed for ten minutes in cold water containing 3 per cent. of commercial formalin (equal to 40 per cent. of formaldehyde). On removal immerse the fruit for five minutes in cold water, and afterwards place it on wire-netting or some similarly open material to drain and dry.

When the fruit has a rind or 'skin' that is not eaten, the immersion in water after treatment in the formalin solution can be omitted with advantage.

The rotting or fermentation of ripe fruit was proved by Pasteur to be due to the presence of living organisms—fungi and bacteria—on the surface.

From this starting-point it was inferred that, if these organisms could be destroyed, the period during which such fruit could be kept in a perfect condition could be considerably prolonged; and a series of experiments conducted in the Jodrell Laboratory at Kew proved the inference to be correct.

The fruits experimented upon were ripe cherries, gooseberries, grapes, pears, and strawberries. The fruit was not selected but purchased from shops or, in some instances, from vendors in the street.

This fact suggests that the method of fruit preservation described here, although valuable in extending the duration of home-grown fruit in good condition, will eventually prove to be of the greatest importance in enabling our markets to be stocked with many delicious kinds of tropical fruit, which under present conditions never reach us.

RICE CULTIVATION IN BRITISH GUIANA.

According to the report of the Immigration Agent-General in British Guiana for the year 1904-5, rice growing is assuming greater importance every year. This industry is to a large extent in the hands of the East Indian population. The following are extracts from the report:—

District 1, Berbice.—During the period September to December 1904, 2,770 acres of rice were reaped on twelve estates in this district, the yield varying from about $9\frac{1}{2}$ to 40 bags of paddy per acre.

District 2, East Coast, and 3, East Bank.—This industry is still largely on the increase, but it is to be regretted that the very severe drought which prevailed during a portion of the year greatly hampered the industry. There are 924 acres of land under rice cultivation on estates in my district.

District 4, West Bank and West Coast.—From the returns furnished me from estates in this district it appears that there were $1,912\frac{1}{2}$ acres under rice cultivation on estates. This, although lower than in previous years, does not mean that there has been any falling off in the total area under cultivation, as there has been an appreciable increase of rice farms in villages. As sowing is now proceeding, no estimate can be made of the expected crop, but with favourable seasons the average yield should be about 20 bags per acre. The estimate of last crop was unfortunately not realized, owing to a spell of dry weather just when the grain was forming.

District 5, Essequibo.—I am glad to be able to report that this industry continues to develop. It has been taken up to such an extent by the people of all nationalities that the estates' authorities experienced great difficulty at times in obtaining their services as agricultural labourers. There are three factories on the Essequibo Coast, all of which are, I understand, kept fully employed during the reaping seasons. The yields from the two crops reaped during the year were, I am informed, very good, and the prospects for the coming season are most encouraging. No fewer than 2,872 acres are in rice cultivation.

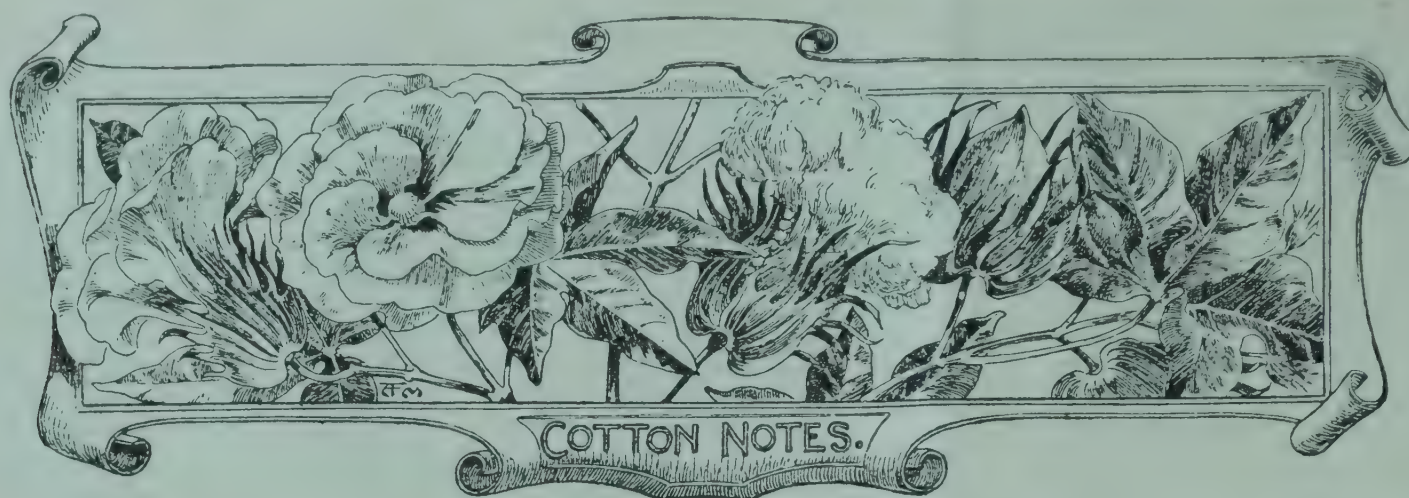
TRADE BETWEEN MARTINIQUE AND THE BRITISH WEST INDIES.

The following extracts from the *Consular Report* on Martinique relative to possible opportunities for trade with the British West Indies are likely to be of interest:—

A small quantity of fruit and vegetables, of the value of £723, was imported from the neighbouring British West Indies in 1904. The heavy duty on these products will, however, prevent the development of this trade.

Merchants in the neighbouring British islands who have empty ale or stout casks to dispose of will find ready sale for them in Martinique, where they are used for exporting rum.

Martinique is the entrepôt for the earthenware cooking utensils much used in the West Indies, and known as 'terraile.' Cargoes of them are received by sailing ship from Marseilles and are sold locally or shipped in small lots to the British islands. This business is apparently profitable, and could be taken up by Barbados, which, occupying a central position and with frequent communication with the British islands, seems well fitted to act as a distributing centre.



ANGUILLA.

Dr. Francis Watts has forwarded the following interesting report on the progress of cotton cultivation at Anguilla:—

The shipment of 30,977 lb. of cotton from Anguilla during the half-year ending June 30, 1905, to be followed, I presume, by further small shipments during the following quarter, is a fact too significant to be overlooked.

Mr. Shepherd also informs me that an amount of selected cotton seed has been imported from St. Vincent sufficient to plant upwards of 1,000 acres. How much will be planted I am not in a position to say, but remarkable activity now prevails. There are two small ginneries, each with an oil engine, and keen commercial competition exists between Messrs. Romondt and Rey, both of whom are making offers for the purchase of seed-cotton.

With anything like a good season the output of cotton from Anguilla should, next year, amount to something very considerable. This is most important, for of late years Anguilla has been an unproductive island and its administration has been a source of anxiety to the Government. The rapid development of a cotton industry should change all that.

ROTATION IN COTTON CULTIVATION.

Mr. J. R. Bovell, F.L.S., F.C.S., has forwarded the following note on cotton cultivation at Barbados in relation to a regular system of rotation of crops:—

The cotton industry can be maintained at a high state of efficiency if a regular system of rotation is practised. This rotation should be as follows:—sugar-canes, sweet potatoes, cotton, and Indian corn, and then sugar-canes again commencing the rotation anew. To put it a little more fully, if sugar-canes were reaped in, say, 1905, sweet potatoes should be planted in August or September that year. These potatoes would be ripe at the beginning of 1906. As soon as they are dug the land should be manured and prepared for cotton, which should be planted in about June of 1906. The land under cotton should remain under that cultivation until about the end of May 1907, when the plants should be dug up and Indian corn sown. When the Indian corn is reaped the land should be manured, and sugar-canes planted during November or December of the same year. In this way the ratooning of cotton would be avoided, and all cotton plants, many of which are found, at the end of the first year, to contain immense numbers of insects, would be destroyed before the new cotton crop was planted, thus preventing any likelihood of the new cotton being infected with scale insects from the old crop.

EXPORTS FROM THE WEST INDIES.

The following is a statement (furnished by the Custom's Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West Indian Colonies during the quarter ended June 30, 1905:—

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	181	69,206	£3,460 6 0
St. Vincent ...	140 ³ / ₄	44,606	2,230 0 0
St. Kitt's... ..	100	27,712	1,385 12 0
Nevis	422	84,650	4,232 10 0
Anguilla	72	13,777	688 17 0
Antigua	150	27,000	1,350 0 0
Montserrat ...	15	4,934	246 6 0
Grenada			
(Marie Galante)	567 ¹ / ₂	170,522	2,150 10 0
British Guiana	6*	231	9 6 10
St. Lucia... ..	1	203	12 0 0
Virgin Islands...	12	2,400	70 0 0
Jamaica	150	30,826	1,282 0 0
Trinidad	21	5,392	190 0 0
Total	1,838	481,459	17,307 7 10

* Bags.

The exports for the quarter ended March 31, 1905, were published in the *Agricultural News* (Vol. IV, pp. 151 and 214). The following table shows the exports for the season 1904-5 (up to June 30) compared with similar returns for the previous season:—

	Bales.	Weight in pounds.	Value.
1903-4.			£ s. d.
Quarter ending Decr. 31	...	...	...
" " March 31	605 ³	145,036	5,440 1 6
" " June 30	1,450 ²	415,209	13,314 14 0
Total	2,055	560,245	18,754 15 6
1904-5.			£ s. d.
Quarter ending Decr. 31	31	7,938	391 0 0
" " March 31	1,369 ¹	418,166	19,608 2 0
" " June 30	1,838	481,459	17,307 7 10
Total	3,238	907,563	37,306 9 10

¹ including 33 bags; ² including 12 bags; ³ including 74 bags.

The following is a statement showing the amount and estimated value of Sea Island cotton exported from the West Indian Colonies (in order of output) during the half-year ended June 30, 1905.

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	589	208,363	£10,418
Nevis ...	658	131,658	6,582
St. Vincent ...	290	95,815	4,790
St. Kitt's ...	246	75,345	3,767
Montserrat ...	146	70,723	3,486
Grenada			
(Marie Galante)	667	200,622	2,508
Antigua ...	223	40,140	2,007
Anguilla ...	158	30,977	1,550
Jamaica ...	150	34,744	1,436
Trinidad ...	21	5,392	190
Virgin Islands...	18	3,600	120
British Guiana..	8	1,258	36
St. Lucia...	33	988	25
Total ...	3,207	899,625	36,915

SEA ISLAND COTTON FOR THREAD.

One of the most important uses to which Sea Island cotton is put is in the manufacture of 'sewing cotton.' For this a very high grade of cotton is necessary. The *Cotton Trade Journal*, of Savannah, for August 5, deals with the qualities of cotton most desired for this purpose. The importance of this trade to growers of Sea Island cotton is discussed as follows:—

Of great importance to the Sea Island planters and merchants of the south is the fact that these reputations for fine spool threads have largely been possible through their individual efforts in the cotton fields. It requires long, strong, good Sea Island cotton to make the best thread. It is claimed that Egyptian cotton is used to a large extent in thread making, and that the better long-staple cottons are occasionally used. These claims are doubtless true in some cases. The fact remains, however, that the reputation upon which an industry amounting to millions of dollars rests is the use of the finest grade of Sea Island cotton in making their product. The thread makers who have these reputations will not dare substitute any other staple for their thread. It is commonly known that this would be regarded by them as a most hazardous procedure. Once the quality begins to falter, the maker would be exposed to attacks that would soon put his product out of demand.

Planters should, therefore, realize the necessity for keeping up the quality of their cotton, because thread makers require the very best and are willing to pay fancy prices to get it. As much profit may be made in the quality of the cotton produced from a small acreage, as would be made out of a poorer quality from a much larger acreage. Closer attention should be given to cultivation from start to finish.

The outlook in America for the thread trade, as judged by reports to us from jobbers and merchants over the country, is good, and promises to increase steadily from now until fall. The demand is from both the army of one-spool consumers and the large manufacturers, such as collar makers who use 2,000-yard spools. The outlook being as it is, encouragement exists for the planter to expect a satisfactory price for his product.

COTTON CULTIVATION AT JAMAICA.

The Imperial Commissioner of Agriculture was present at the half-yearly meeting of the Jamaica Agricultural Society on August 16. In the course of an address Sir Daniel expressed his pleasure at being able to bear testimony to the interesting and valuable work which the society was doing in Jamaica. Referring to the subject of the cultivation of cotton, he said:—

He had heard the previous day for the first time that the cultivation of cotton had been very seriously handicapped by the attacks of insect and fungoid pests. If specimens had been sent to him, he would have been glad to afford information as to methods of combating them. While on his way from the United States in 1903, he had called at Jamaica and delivered an address on cotton growing. He had then pointed out the difficulties likely to be met, and drawn attention to the cotton worm, pointing out how destructive it might be unless taken in hand. In other parts of the West Indies the cultivators had no fear of the pest, and they made provision for combating it with Paris green. In Jamaica, however, cotton had been seriously attacked by the worm.

The cotton worm when fully grown was about $1\frac{1}{2}$ inches long; the right stage at which to attack it was soon after it had hatched, when only about $\frac{1}{4}$ inch long. At that stage it was capable of being destroyed by a very light dusting of Paris green, later, at every stage, it was more difficult to get rid of, until at last the crop was so seriously damaged that it was not worth while to apply Paris green at all. The important point was to detect the worm directly it appeared. On that depended the whole success of the treatment. The worm was mostly to be found in the centre of the cotton field, consequently those persons who merely rode round their fields would, in a short time, have the larger part of their crop destroyed, as the pest was known to spread very rapidly.

Sir Daniel then drew attention to an interesting paper, by Mr. J. R. Bovell (published in the *West Indian Bulletin*, Vol. VI, no. 2) in which full details were given as to the cost and profits of growing cotton on ten estates in Barbados with 95 $\frac{1}{4}$ acres. The cost per acre of growing cotton varied from \$10.45 on one estate to \$28.39 on another.

The Imperial Department of Agriculture had handled, during the half-year ended June 30 last, fully £10,000 worth of cotton for Barbados. In Barbados, Antigua, and St. Kitt's-Nevis, the people were increasing their cultivation by 50 per cent., as they believed that cotton growing was a paying concern.

Of course the circumstances might be different in Jamaica. He was not advocating cotton growing there; he was simply laying before them information in regard to the industry. The exportation of cotton from Jamaica was disappointing. According to figures supplied by the Collector General, the value of the cotton exported from the island for the half-year ended June 30 was £1,436. The value of cotton exported from the West Indies generally for the same period was a little below £40,000: Barbados led with a value of £10,000, and Nevis, St. Vincent, and St. Kitt's followed closely.

It may be of interest to add that it is stated in the *Journal of the Jamaica Agricultural Society* that the cotton crops in the Vere district turned out very favourably, and the acreage was being considerably extended. 'In all there may be fully 1,500 acres of Sea Island cotton growing in Jamaica.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue contains certain recommendations in connexion with the shipment of cotton, to which it is desired to draw the attention of cotton growers.

Several notes in reference to the sugar industry will be found on pp. 274-5. In St. Kitt's the prospects of the industry are reported to be much improved; in Martinique the position is the reverse of satisfactory.

The banana industry of the Canary Islands appears to be still in a satisfactory position, in spite of the warnings that the increased shipments of bananas from the West Indies would ruin the trade. (See p. 276.)

The cotton notes on pp. 278-9 contain a statement of the exports from the West Indies during the present year. An interesting note on the use of Sea Island cotton for thread-making serves to indicate the importance of producing a high and uniform grade of cotton for this branch of the trade. A brief summary is published of an address on cotton cultivation delivered by the Imperial Commissioner of Agriculture in Jamaica.

An interesting table is published on p. 283 showing at a glance some of the results of the introduction of poultry of improved breeds into Antigua.

On p. 285 will be found brief reviews of several official publications recently issued in the West Indies.

West Indian Agricultural Conference, 1906.

An extract from a letter from the Acting Colonial Secretary, Jamaica, to the Imperial Commissioner of Agriculture for the West Indies was published in the *Agricultural News* (Vol. IV, p. 131), in which reference was made to the proposal to hold the next West Indian Agricultural Conference in Jamaica. The Imperial Commissioner was assured that the agricultural community in Jamaica welcomed the idea of holding the Conference there in January next.

At the half-yearly meeting of the Jamaica Agricultural Society held on August 16, at which Sir Daniel Morris was present, a committee was appointed to confer with him in regard to the arrangements. The committee consists of Messrs. Robert Craig, J. R. Williams, and John Barclay, Secretary.

The Colonial Secretary (the Hon. Clarence Bourne) and the Hon. Wm. Fawcett, Director of Public Gardens and Plantations, have been selected to represent the Board of Agriculture on this committee.

Peppers from Nevis.

A shipment of peppers from the Nevis Experiment Station, recently forwarded to London by the Imperial Commissioner of Agriculture, has been disposed of at very good prices.

The consignment consisted of 64 lb. net weight of yellow Nepaul peppers and 53 lb. of ordinary red chillies.

The former realized the very high price of 51s. per cwt. This, however, is not, according to the brokers' report, to be attributed to their intrinsic value, but to their being in a very small lot and to competition between two bidders who particularly wanted them. 'We should not think it safe to expect more than 30s. per cwt. for any quantity.'

The red chillies realized 26s. per cwt. These were reported slightly mouldy and would appear not to have been properly dried before shipment.

In this connexion reference might be made to the note in the last issue of the *Agricultural News* (p. 268), stating that inquiries had been made in London for capsicums in bulk.

Exports of Martinique.

From the review of the sugar industry of Martinique, published elsewhere in this issue, it will be gathered that the year 1904 was a bad one for the principal industry of the island. The exports of other products such as cacao, coffee, etc., according to the *Consular Report*, also show decreases.

Efforts are being made to start a banana industry, taking advantage of the frequent communication between Fort-de-France and France. Experimental plots were also planted in cotton. Crops of cotton were raised in Martinique during the American civil war, the output during the years 1861-5 inclusive being valued at £15,219.

Small quantities of logwood, vanilla, and musk seed were exported during 1904.

Cotton Exports from the West Indies.

The statistics published on pp. 278-9, showing the amount and estimated value of Sea Island cotton exported from the West Indian Colonies during the quarter and half-year, respectively, ended June 30 last, are of distinct interest. It will be seen that very decided progress has been made.

The table on p. 279 shows the half-year's output from the various islands arranged in the order of the value of the cotton exported. Barbados heads this list with an export of 589 bales of the estimated value of £10,418. Nevis comes second with 658 bales, valued at £6,582, and is followed by St. Vincent, St. Kitt's, and Montserrat.

The largest number of bales shipped from a single colony is 667 from Grenada. As, however, most of this was Marie Galante cotton, which realizes a much lower price than Sea Island, the value of the cotton exports from Grenada were only £2,509. The total exports from the West Indies during the six months amounted to 3,207 bales, of the estimated value of £34,915.

It may be mentioned that the following telegram has been received by the Imperial Commissioner of Agriculture from the British Cotton-growing Association:—

'Congratulate you, your staff and planters on the marvellous success of the cotton crop.'

Agricultural Progress at St. Kitt's-Nevis.

Reports by Dr. Watts on recent visits to St. Kitt's-Nevis bear testimony to the agricultural progress in the presidency. Elsewhere in this issue is published a note on the sugar industry at St. Kitt's. It is recorded that the crop has been satisfactory during the past year and the prospects for the future are very favourable. Attention is drawn to the advantage the island has reaped from the introduction of new varieties of canes, and to the lively interest taken by the planters in the sugar-cane experiments.

The cotton industry is fairly established at St. Kitt's and has, so far, proved remunerative, especially in consequence of the small cost of cultivation, since the cotton is grown as a catch crop with sugar-cane.

The position of the cotton industry at Nevis is even more satisfactory. This was referred to in the last issue of the *Agricultural News* (p. 262). Cotton growing has proved distinctly remunerative at Nevis and a considerably increased production is looked forward to next season.

Both at St. Kitt's and Nevis efforts are being made to extend the cultivation of cacao, which bids fair to prove remunerative. Rubber trees also are being planted at St. Kitt's in considerable numbers.

Dr. Watts concludes his report: 'In all of which there is much that is hopeful, and one now feels that there is in St. Kitt's a more marked tendency towards progress and a readiness to adopt new ideas. . . . Owing chiefly to cotton, and to developments on the agricultural side, the prospects of Nevis appear brighter than I have ever known them.'

Crown Lands at St. Lucia.

According to the report on the Crown Lands and Survey Department, St. Lucia, for 1904, 122 applications were received during the year for a total of 843 acres. Of these seventy-five matured (that is, were accepted, fees paid thereon, and surveys carried out), leaving a balance of forty-eight to be dealt with during the following year.

Of these applications 105 are for blocks of 10 acres and under, while seventeen exceed 10 acres in extent. The Commissioner of Crown Lands reports that these facts show that the agricultural labourer is gradually acquiring his own holding and settling upon the land.

Wood cutting upon high lands is carefully watched, and every effort made to prevent it taking place upon lands of the Crown. Unfortunately, many private individuals, either through ignorance or wilful neglect, allow their hill tops to be cleared of forest growth. Efforts are made to get these people to appreciate the value of forests in connexion with the water supply.

The demand for economic plants for free distribution has increased, amounting during the year to 4,305, as against 975 in the previous year. The difficulty in transporting boxes of plants by the peasants, who must 'head' them to their lands, deters many from availing themselves of this great advantage.

Butter Making in Trinidad.

Mr. C. W. Meaden, Manager of the Trinidad Government Stock Farm, read an interesting paper (published in the *West Indian Bulletin*, Vol. VI, no. 2) at the last West Indian Agricultural Conference on experiments carried out at the farm in connexion with butter making.

Mechanical separation of the cream is essential in the tropics on account of the long delay required by the settling process. The separator used at the farm was an Alpha-Laval with a capacity for separating 55 gallons of milk per hour. It can be worked by one strong boy.

The cream was placed in a 'Champion' churn, having a capacity of 3 gallons, with an end-over-end movement. Churning was done from 6 to 7 a.m., when the temperature was about 75° F. Brine was successfully used for salting. The butter was worked with an ordinary butter worker; for small quantities Scotch 'hands' can be used.

A good starter is necessary, as it hastens the development of lactic acid and controls, to a great extent, the flavour of the butter. This was prepared by setting a sufficient quantity of the separated milk in a special vessel covered with muslin about 4 p.m., the vessel being placed in the sun in the morning to hasten fermentation. After ten or twelve hours the curd is removed, and the whey is ready to be added to the cream.

A point of special interest in connexion with these experiments is that it has been demonstrated that it is possible to turn out a good, firm butter without the use of ice.



INSECT NOTES.

Insect Pests in Porto Rico.

The Annual Report of the Porto Rico Agricultural Experiment Station for 1903-4, recently issued, contains a chapter on insect pests in which the principal insects of the year are briefly reviewed.

It is interesting to note that no complaint was received of damage done by the changa or mole cricket during the year. The bait of grass and Paris green, the use of which was described in the *Agricultural News* (Vol. II, p. 200), is being used with good results, and the freedom from injury from the mole cricket is attributed to the general use of this bait.

The bud maggot (*Lonchaea chalybea*) of the cassava has continued a serious pest. This is a small fly, the larvae of which live in the terminal buds of the cassava stems. Hand-picking of the infested portions has been found the best remedy, though the application of tobacco dust has at times given good results.

The coffee leaf-miner has long been known as a serious pest of coffee. It is estimated to cause a loss of \$150,000 to \$300,000 in one year in Porto Rico. Recently, however, this pest has been on the decrease in several districts of the island, due largely to the attack of a small Hymenopterous parasite (*Chrysocharis lividus*) which destroys the larvae of the leaf-miner. This parasite was first named from a specimen collected in St. Vincent, but its habits were not known until recently. It is hoped that this parasite will continue to increase in numbers and further reduce the damage by the leaf-miner.

Application of Paris Green.

The rapid development of the cotton industry in the West Indies during the past few years has been followed by an equally rapid development of the cotton worm.

In order to grow cotton successfully, it is now generally admitted that it is necessary to use some insecticide for controlling this pest. Of all the insecticides on the market Paris green is the best known and most extensively used in the West Indies. Other insecticides are London purple and lead arsenate. Paris green and London purple are sold as dry powders and may be applied to plants as a dust or in water as a spray, while lead arsenate is sold in the form of a wet paste and can be applied only as a spray.

In the cotton-growing districts of the United States, extensive experiments have been carried on in the use of insecticides and with a great variety of machines for their application.

Spraying machines from the simplest form of bucket sprayer, which is carried about and operated by one man, to the elaborate sprayer, drawn by a pair of horses and fitted to spray sixteen rows of cotton at one time, have been tried, as well as a great variety of dusters, sifters, powder guns, bellows, etc.

Many of these have been ingenious devices invented expressly for use in the cotton fields, and yet with all these available the common practice is that of sifting the poison

through cloth in such a way that it falls as a fine dust on the plants. This method, which has already been described in the *West Indian Bulletin* (Vol. IV, pp. 271 and 310), is briefly this: A bar of wood about 5 feet long has at each end a small bag of osnaburg which carries the poison. A boy mounted on a mule carries this in front of him in such a way that the bags hang above the cotton rows. A gentle tapping of the bar with a small stick causes the poison to sift out over the plants. In the Sea Islands a shorter bar is used with a bag at one end. In this case the labourer is not mounted, and the bar is used merely to enable him to get the bag of poison above the topmost leaves of the plant. In the West Indies the most common practice is to use a bag of 'ticklingburg' for sifting the mixture of Paris green and lime over the plants. On some estates the bag is used attached to a short stick, but on others the bag is held in the hand and the poison is sifted from the bag by shaking it over the plants.

Powder guns and spraying machines are also in use to some extent and are said to give satisfactory results.

The powder gun is a machine for applying poisons in a dry condition. It consists of a receptacle for holding the poison, a revolving fan for blowing it out, and a long tube to give direction to the blast of air carrying the poison. The machine is carried and operated by one man, and it is claimed that its initial cost is justified by the greater amount of work done by one man and by the great saving in the amount of Paris green used. While there is no doubt that a great saving could be effected on certain estates in the amount of Paris green used in dusting with the bag, it will generally be found that such estates are using far more than is needed, that is, the labourers are wasting it. In such cases it might be found that the use of the powder gun would stop this waste.

In the first place, instead of having bags made of proper material and of a convenient size, some estates use an ordinary sacking, such as oat sacks, bran sacks, etc., which are of too coarse a texture, and, in addition, are too bulky and cumbersome.

One estate in Barbados found by careful calculation that last season the cost of each treatment was about 2s. per acre of cotton. This included Paris green, lime, and the labour of applying. The poison was used at the rate of 1 lb. to 6 lb. of lime and this gave excellent results. The amount of Paris green used per acre was a little over 1 lb. The same treatment this season is giving as good results up to the present time. In other cases, however, as much as 5 or 6 lb. of Paris green have been used per acre for a single application; the use of such a large amount would indicate that the poison is being wasted. In other cases, again, it is said that, although plenty of Paris green has been used, the worms have not been killed. This has probably been the result of delaying the application too long. There are still in Barbados estates where great numbers of worms are allowed to become nearly full-grown before they are noticed and it is then too late to stop their ravages.

For the successful treatment of this pest it is necessary that a sharp lookout be kept and that steps be taken at once to check it by prompt application of poison. An excessive amount of poison can do no good, only a certain amount falls on the leaves and the rest is wasted.

If rains wash off the poison another application must be made. Cotton growers, who keep a careful lookout for the first and all subsequent appearances of the worm and who see to it that the poison supplied to the labourers is properly used and not wasted, will find that the worm can be controlled, and that without great expense.

EDUCATIONAL.

School Gardens in Porto Rico.

The annual report on the Agricultural Experiment Station in Porto Rico has the following note on school gardens:—

The station is co-operating with the public schools of Mayaguez in carrying out a system of school gardens, with the hope of interesting the coming generation in agricultural pursuits. It is important that in the scheme of education in the island attention be paid to certain practical affairs, of which agriculture is destined to remain chief. A school garden would be especially important because of the fact that while many of the people are extremely poor they fail to have gardens growing about their little houses, depending wholly upon nature to provide some of the necessities of life that might be easily procured with a little labour. The station is endeavouring to encourage the planting of gardens by the men working in the various departments. Seeds and manures are furnished and every encouragement given them to plant gardens about their houses for their own good and as an example to their neighbours.

St. Vincent Agricultural School.

The St. Vincent *Sentry* of September 1 has the following article on the Agricultural School established in that island by the Imperial Department of Agriculture:—

Every visitor to this island, who has the opportunity of seeing the Agricultural School and its beautiful grounds, is most favourably impressed and recognizes the great advantage the institution affords the rising generation. The school is one of the best efforts of the Imperial Department of Agriculture for the West Indies, and the attention being paid to it by the efficient officers, to whose immediate care it is entrusted, renders the institution a credit to the colony in every respect. Up to the present, several boys who have completed their course of training in the school have left well equipped for agricultural employment. Some of them have already obtained positions affording them an opportunity of putting their scientific training into practice, and their advancement is almost certain.

It is the desire of the Imperial Commissioner that as many parents as possible should make use of the facility offered for giving a proper agricultural education to boys of this colony who are likely to follow an agricultural life. In view of the growing interest in scientific agriculture and the great difference there is in results attained by the old methods and the new, it is a matter of the greatest importance that agriculturists and planters, who are solicitous for the welfare of their boys who may have to succeed them in the management of their estates or plantations, should take hold of the opportunities the local Agricultural School is offering for the requirements of scientific instruction. In connexion with this subject we recommend to the careful attention of our readers the following remarks of Mr. Horace Deighton, ex-Head Master of Harrison College, Barbados.

'For my part, I consider the action taken by Sir Daniel Morris in promoting the study of science is one of the greatest boons he has conferred on the West Indies. No thinking man can doubt that an agriculturist unequipped with a scientific training labours under serious disadvantages compared with his trained rival. It is not so much the mere

knowledge of chemistry, botany, etc., which he has acquired in the laboratory—great as the value of this is—which will be of use to him; but the habit of mind and resourcefulness induced by his scientific training, the alertness and quickness of observation to which he may attain, will be found of the greatest possible service in the work of his life.'

We cannot say more than this, in order to impress parents as to the utility of the Agricultural School which offers the benefit of agricultural training of a high standard together with an efficient general education which is the foundation for effective technical instruction. The latest issue of the *Agricultural News* (Vol. IV, p. 261) gives interesting information respecting the Agricultural School here, and parents are invited to participate in its benefits.

IMPORTED POULTRY AT ANTIGUA.

The following note indicating the success that has attended the efforts of the Department to improve the poultry at Antigua by introducing imported birds is extracted from the annual report on the Botanic Station for general information:—

In 1903 five varieties of poultry were obtained and placed at the Government Farm at Skerrett's, and Buff Orpingtons were presented by Sir Gerald Strickland. They have recently been transferred to the Scott's Hill Experiment Station.

As the data gathered while the birds were at Skerrett's has not been published, it is thought that the following may prove interesting to poultry keepers.

The names of the varieties imported are Buff Orpington, Buff Plymouth Rock, Barred Plymouth Rock, Buff Wyandotte, Black Minorca, and Brown Leghorn. A description of these varieties will be found in Pamphlet No. 23, published by the Imperial Department of Agriculture entitled 'Notes on Poultry' which can be obtained at the local agents of the Department.

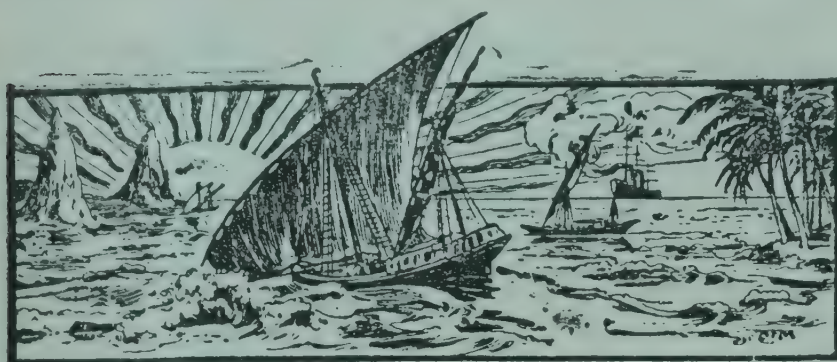
The heavier or 'table' breeds have found most favour, owing, largely, to the fact that the common fowls are small and active and that the improvement by the cross between them and the Minorca or Leghorn is not so apparent as in the case of the cross with the heavier varieties.

In this respect the Barred Plymouth Rock has been found to give the best results, especially when three-quarter bred, the young birds being hardy and active, while retaining the appearance and rapid fattening properties of the pure-bred stock.

The original birds were imported from Canada, and the following table will give the results of the first year's work:—

Variety.	No. of Cocks.	Fowls (Hens).	Total.	Total No. eggs laid first year.	Average No. per hen.	Average weight per egg in	
						Gram.	oz.
Buff Orpington ...	1	10	11	511	51.1	60.5	2.1
Barred Plymouth Rock	1	2	3	266	183.0	48.9	1.7
Buff Plymouth Rock	1	2	3	69	34.5	64.0	2.2
Buff Wyandotte ...	1	2	3	204	102.0	51.8	1.8
Brown Leghorn ...	1	2	3	167	83.5	44.4	1.5
Black Minorca ...	1	2	3	147	73.5	65.2	2.3

At first, as the demand was large, the price charged for the eggs was 4d. each, but the price has been gradually reduced, and the eggs are now sold at 1s. 6d. per dozen.



GLEANINGS.

The Barbados Scholarship for 1905 has been won by Mr. C. K. Bancroft in natural science. Mr. Bancroft was a student in the science department at Harrison College.

By the R.M.S. 'Orinoco' which left Barbados on August 26, the Imperial Department of Agriculture shipped 1,291 bunches of bananas and 7 bales of cotton.

During the past year some 10,000 seedling forest trees were raised in the nursery at the Botanic Station at Antigua and planted out in the re-forestation plots outside the station.

The exports of cacao from Martinique in 1904 were 701,628 lb., valued at £17,101, there being a decrease of 32,373 lb. in quantity and of £2,226 in value from the exports of 1903. (*Consular Report.*)

The half-yearly report of the London and North-western Railway Co. states that the directors have decided to recommend the proprietors to make a grant of £1,000 to the funds of the British Cotton-growing Association.

According to the report of the Local Instructor, the onion crop at Montserrat last season was 165 barrels. The onions were of excellent quality and fetched good prices, viz., 3c. and 4c., in the other islands.

The attendance at the Colonial Exhibition since the opening day and up to Saturday, August 12, has been 733,671. On Bank Holiday, August 7, 41,078 persons passed the gates. (*West India Committee Circular.*)

The principal honey flowers in Montserrat are logwood, pigeon peas, limes, alfalfa, and red cedar. Logwood honey is considered the best and is of a light colour. Eleven hives are run at the Botanic Station for extracted honey.

A correspondent in Nevis writes: 'I am confident that the acreage under cotton will work out at 50 per cent. in excess of that of 1905. Cotton has certainly "caught on" in Nevis and is the chief topic of conversation among the planters.'

In his report on the London drug and spice markets for July, published on p. 287, Mr. Jackson refers to the use of Quillaja bark in the manufacture of effervescing drinks. This bark is obtained from what is known as the soap tree of Chili (*Quillaja Saponaria*), a South American plant belonging to the order *Rosaceae*. The bark is rich in saponine, a vegetable soap, and is also used in the preparation of hair washes and as a substitute for ordinary soap.

At the Dominica Botanic Station there is a good demand for seed and plants of *Castilloa* rubber. In a few years a considerable area under this cultivation should be ready for tapping experiments.

The principal exports of Curaçoa are divi-divi, salt, and goat skins. The exports during 1903 of divi-divi (the pods of *Caesalpinia coriaria*, used for tanning purposes) were valued at £33,428. These pods are also exported, in small quantities, from some of the British West Indies.

The *Dominican* records that the largest shipment of green limes to New York ever made from the West Indies was made on the S. S. 'Parima' from Dominica on July 28. The shipment amounted to 2,182 barrels. The sales in New York during the last few months have been most satisfactory.

The first annual sale of stock was held at the Tobago Government Farm on August 9. The sale was most successful, the competition being keen and the bidding animated. Such sales afford a valuable means of distributing improved animals throughout the island.

According to the *Gleaner*, the Jamaica Preserves Company is engaging in the manufacture of fruit jellies, pulp, etc., especially from guavas and pine-apples. Last year some 20 tons were shipped. Sir Alfred Jones, K.C.M.G., is a director of the company.

According to *Gleanings in Bee Culture*, it has been proved in the United States that bee keepers need have no fear of their bees being poisoned through the use of Paris green in the cotton fields. It is stated: 'There is no authentic case on record where bees were poisoned by working on poisoned cotton.'

According to the report of the Manager of the Government Stock Farm, Trinidad, molascuit was placed on the food list during the year. This article was prepared by one of the sugar estates, and after fair trial is pronounced useful, especially for milch cows. It is cleaner than ordinary molasses, keeps better, and is not so readily stolen.

According to the *Consular Report* on Guatemala, the growing of bananas is destined to be one of the principal industries of the country. The completion of the Guatemala Railway will open a large tract of land suitable for banana growing. The United Fruit Co. is the principal undertaking interested, and all the bananas grown are shipped to the United States.

In addition to the cultivation of bananas, which is the principal industry of the Canary Islands, large quantities of tomatoes and potatoes are grown. According to the *Consular Report* for 1904, the exports of tomatoes show an increase of 6½ per cent. on the returns for 1903, the value of the exports being £236,350. There was also an increase in the exports of potatoes which were valued at £41,200.

An Ordinance has been passed by the Legislature of Antigua providing for the fumigation of plants imported into the presidency. It follows closely those in force in Jamaica and Dominica, the provisions of which have already been published in the *Agricultural News*. Notices have been issued to the public warning them of the requirements of this Ordinance, and arrangements are in progress for the erection of the necessary fumigating chamber.



MONTSERRAT: ANNUAL REPORTS ON THE BOTANIC STATION AND EXPERIMENT PLOTS, 1904-5.

This report deals with the Botanic Station at Grove and the Olveston and Harris' Experiment Stations. The expenditure during the year amounted to £595 17s. 9d. The sum of £41 1s. 5d. was realized by the sale of plants, etc.

The report again shows an increase in the number of plants (mostly economic) distributed, which was 35,377, in addition to 11,439 cuttings and considerable quantities of seed. The results of the experiments with economic plants are stated in detail in the report; in each case a detailed account of the expenditure incurred on the experiments is given.

The rainfall at Grove Station was 51.01 inches, at Olveston 60.02 inches, at Harris' 44.18. Comparison with the returns for previous years shows that the year was considerably drier than usual.

Progress has been made in the establishment of the cotton industry. The area under cotton during the season 1904-5 was 680 acres; the shipments amounted to 70,000 lb. of lint (valued at £3,384), as against 27,600 lb. for the previous season. The cotton worm and leaf-blister mite were kept in check without much difficulty by the application of insecticides; considerable trouble was, however, experienced from the attacks of the 'black boll' disease. The local officers of the Department rendered valuable assistance in visiting estates and reporting on the prevalence of pests.

This report also contains a report of the work done by the Local Instructor, who furnishes a list of places visited by him during the year and, in addition, interesting observations on the prospects of various minor industries of recent introduction.

PORTO RICO: ANNUAL REPORT ON THE AGRICULTURAL EXPERIMENT STATION, 1904.
By D. W. May, Special Agent-in-charge.

Considerable expenditure was incurred during the year in draining the low-lying lands at the station. The tile system of drainage has been introduced with satisfactory results. A system of irrigation has also been introduced.

Efforts are being made to develop the fruit and vegetable industry. Trial shipments are to be made of perishable fruits and vegetables to New York.

The stock of plants for distribution has been greatly increased. Special attention has been paid to the collections of bananas, yautias (tannias), cassavas, and yams.

Various fungoid diseases have also been under investigation. These include the tomato wilt, which appears to be common in the West Indies. A note on this disease will be found in the *Agricultural News* (Vol. IV, p. 43).

Attention is being paid to the propagation of improved varieties of miscellaneous tropical fruit trees. Reference is made to the desirability of producing and propagating improved varieties of such fruits as the guava, hog plum, mango, etc.

TRINIDAD: ANNUAL REPORT ON THE GOVERNMENT STOCK FARM, 1904-5. By C. W. Meaden, Manager.

Mr. Meaden is able to report a better record with the herd than in the previous year. Various improvements have been made at Valsayn. It is suggested that the farm at Tobago will serve as a useful sanitarium for acclimatizing imported stock before they are located at the Trinidad farm.

Two bulls were imported from Nova Scotia during the year; 143 calves (mostly three-quarter and half-bred Zebus) were born. These were all of good quality and have not suffered from any kind of sickness.

The total sales for the year realized £882 15s. 6d. The various hospitals received 117,165 imperial quarts of milk from the farm (an increase of 5,657 quarts on the previous year), and 1,126 lb. of butter were made.

Success is recorded in mule breeding. There are now eight young mules from one to three years old, some of which will be put up at the next sale, when it will be possible to judge as to the profits from mule raising.

Favourable results have continued from pig breeding, especially with the Tamworth breed. This breed has, in consequence, been spread throughout the colony, and good accounts have been received of their progress.

The sales of poultry realized \$136.50, yielding a profit of \$34.50. The best results have been obtained with Plymouth Rocks. Belgian hares have also done well, and good results have followed crossing with common selected rabbits, increasing the size and improving the flavour of the flesh.

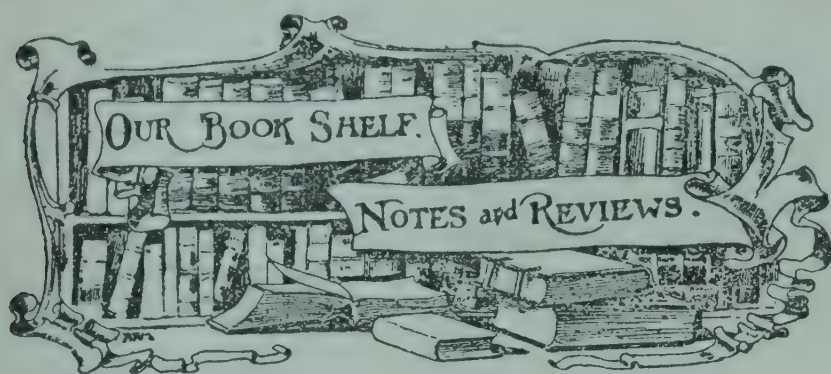
BEE KEEPING IN JAMAICA.

The following note on bee keeping in Jamaica is extracted from *Jamaica in 1905*, which is reviewed elsewhere in this issue:—

Bee keeping does not require much land or capital to start with, nor very great exertion to obtain a moderate return in the climate of Jamaica. It has therefore been taken up by hundreds of persons of small means, sometimes with insufficient skill and appliances. Consequently, Jamaica honey was usually badly, wastefully extracted, taken from discoloured combs and full of dead bees. But the general spread of intelligence, and the working of the Jamaica Bee Keepers' Association led to the employment of frames, extractors, and other improved appliances, and to greater strictness as to condition of honey shipped. In consequence, prices were improved, and though a relapse has occurred, even now are better than they were. But they are still far behind those for the honeys of other countries, even when the quality is the same. However, if a steady improvement of quality continues, no doubt prices will follow in time.

Bee keepers who have had experience in temperate climates must bear in mind that conditions in the tropics are very different. There is no hibernation, and there are nearly always some honey-bearing plants in blossom. Consequently, workers wear out rapidly. Queens are prolific, but they also wear out more rapidly than in England. In some seasons the bees have to be fed for weeks, in others hardly at all. It follows that any one intending to take up this industry in Jamaica should be prepared to take lessons from a practical bee keeper in the island.

Bee keeping should not be undertaken as a means of livelihood, but a man with spare time, a few acres of land, and £25 can soon work up to £30 a year from this source, in almost any part of Jamaica.



JAMAICA IN 1905: By Frank Cundall, F.S.A., Secretary and Librarian of the Institute of Jamaica. Kingston, Jamaica, 1905.

This is 'a new and entirely remodelled edition of a work which first appeared under the title "Jamaica in 1895, a brief hand-book of information for intending settlers and others."'

Interesting sketches are given of the geography and history of Jamaica and of its people. The publication being intended for intending settlers, considerable space is devoted to agricultural notes. These notes, which deal with pen keeping and with planting, are written by some of the foremost agriculturists of the island or by officers of the Agricultural Department.

This little book is nicely got up and copiously illustrated. The illustrations show typical scenery and places of interest, as well as some of the principal cultivations and typical Jamaica polo ponies.

An appendix contains a list of works of reference on Jamaica and a list of the publications of the Institute of Jamaica. There is also a good map (20 x 8 inches) of the island, which will be found very useful for tourists, who are likely to be interested also in the notes on fishing, shooting, and other forms of sport.

Mr. Cundall is to be congratulated upon the appearance of this new issue, which, in addition to serving its purpose in supplying information for intending settlers, should also prove an acceptable guide for tourists and visitors, to the requirements of whom a special chapter is devoted.

METHODS OF CHEMICAL CONTROL IN CANE SUGAR FACTORIES: By H. C. Prinsen Geerligs, Director of the West Java Sugar Experiment Station. Altrincham (Manchester): Norman Rodger, 1905. Price 3s. 6d. net.

A series of articles by the author, which appeared during last year in the *International Sugar Journal*, are here brought together in book form, together with numerous tables and plans not hitherto published.

Full directions are given for sampling cane and cane products for analysis, and for carrying out the analytical methods involved in connexion with chemical control in sugar factories.

The first part deals with the daily report. In part ii directions are given for compiling a monthly (or weekly, as the case may be) report from the data contained in the daily report.

Part iii contains a full list of the instruments and utensils required for the execution of the analyses mentioned in this treatise. The verification and standardization of instruments are also dealt with.

Experiment Station workers, as well as students in training in chemical laboratories connected with sugar-cane experiments, are likely to find this a handy little work for reference and guidance.

VALUATION OF MANURES.

It has been suggested that it would be convenient and interesting if there were published in the *Agricultural News* the scale used by the Analytical Committee of the Barbados Agricultural Society for the valuation of nitrogen, phosphate, potash, etc., in manures. The scale is as follows:—

Value per unit (i.e., 1 per cent.) per ton of 2,240 lb. :—	
Ammonia (from sulphate of ammonia, nitrate of soda, dried blood, flesh, meal, and bones finely ground)	\$2.40
Ammonia (from above sources in mixed manures and in genuine Peruvian guano or similar manures)	\$3.00
Ammonia (from sheep manures and fish scraps in mixtures)	\$2.60
Ammonia (from hoof and horn, hair, and similar materials in mixtures)	\$2.00
Phosphates soluble in mixed manures or guanos...	.90
" reverted " " " " "	.70
" insoluble " " " " "	.25
Phosphates (from finely ground raw or steamed bones in mixed manures)	.60
Potash (as sulphate or nitrate in mixed manures)	\$1.30
The above only apply to mixtures in which	
Ammonia does not exceed 14 per cent.	
Soluble phosphates " 20 per cent.	
Potash " 12 per cent.	
any excess over the above percentages will be calculated as raw material.	

For genuine Peruvian or dissolved Peruvian guano 10 per cent. is added to the valuation made as above.

By direction of the Analytical Committee, in the case of samples taken under 'The Fertilizers and Feeding-stuffs Act, 1894,' the valuation is calculated upon the *guaranteed* analysis.

HEDGE PLANTS.

The following note on some useful plants for hedges is extracted from the Annual Report on the Montserrat Botanic Station:—

Cushaw (*Acacia tortuosa*).—This was raised from seeds in 1903, and is now 6 feet in height and almost as much through. It forms a formidable spiny hedge, though it lacks that density of foliage necessary to make a hedge attractive.

Wild Coffee (*Clerodendron aculeatum*).—In habit this somewhat resembles English privet, and makes a very commendable hedge. This was raised from cuttings in 1903, and is not 5 feet in height and 4 feet through.

Acacia sphaerocephala.—This is a quick-growing plant, and carries dense, dark-green foliage accompanied by large spines. Raised in 1904 from seeds, the hedge is now 3 feet in height and is very vigorous.

Triphasia Aurantiola.—This is one of the most attractive of our hedges, though of slow growth. It carries dense coriaceous foliage, and is of a beautiful green. Raised in 1804, it is now 2½ feet in height.

Bread and cheese (*Inga unguis-cati*).—Where a low, dense hedge is needed, this is excellent; but the pendulous habit of the growth prevents it from attaining much height.

Barbados Cherry (*Malpighia glabra*).—An excellent hedge of this plant is found at the Grove; with frequent trimming, few plants can surpass it for hedge purposes.

Limes.—Where wind-breaks are wanted that will give some return, limes might be advantageously planted. The lime hedge at Grove Station, about 10 feet high, gives a good yield of fruit.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice markets for the month of July has been received from Mr. J. R. Jackson, A.L.S. :—

Throughout July both the drug and spice-markets were generally very dull, the only interest shown being with such articles as are used in the manufacture of cooling drinks, due to the hot, dry weather that prevailed especially about the middle of the month. The articles which were thus affected were such things as citric and tartaric acids, oil of lemon and lemon juice, and notably Quillaja bark which has been for some time past used for producing froth or effervescence to both intoxicating and temperance beverages.

GINGER.

Of this article 170 barrels of Jamaica were offered at the first spice sale on the 5th., and of these 12 barrels only were disposed of at 51s. for middling bright. Cochin and Calicut met with a small demand; small and medium mouldy washed realizing 18s., and fair cuttings 17s. A week later easier prices prevailed, 450 barrels of Jamaica were on sale and only 47 sold: ordinary at 42s. and good ordinary at 45s.; 1,000 packages of Cochin and Calicut were also offered, fifty being disposed of at previous rates. At the third and at the last sales of the month, Jamaica, Cochin, and Calicut were all offered in large quantities but there was practically no demand, good ordinary Jamaica being bought in at 43s.

ARROWROOT.

At the first spice sale none was offered, but on the 12th. of the month some 486 barrels of St. Vincent were on sale, all of which were bought in. A week later some sales were effected of this quality at 1 $\frac{3}{4}$ d., none being offered at the concluding sale of the month.

PIMENTO AND SARSAPARILLA.

Pimento began at easier rates, but at the second sale on the 12th. the quotations were 2 $\frac{1}{4}$ d. for fair, and 2 $\frac{1}{8}$ d. for ordinary.

At the drug sale on the 6th. 1s. 2d. per lb. was realized for 1 bale of grey Jamaica sarsaparilla.—Six bales of native Jamaica were offered and held at from 9d. to 10d. per lb. A fortnight later good red native Jamaica fetched 8 $\frac{1}{2}$ d., and Lima from 1s. 1d. to 1s. 2d.

CASSIA FISTULA, LIME JUICE, KOLA, TAMARINDS, ETC.

Of other West Indian products there were offered at the auction on the 6th., 8 bales of ordinary West Indian Cassia Fistula pods all of which were disposed of at 12s. per cwt. One puncheon of common raw Demerara lime juice fetched 10 $\frac{1}{2}$ d. per gallon, and a half-bag of fair to bold West Indian kola nuts realized 4 $\frac{1}{2}$ d. per lb. A week later good green kola nuts fetched 6d., and good pale lime juice was quoted at 1s. to 1s. 1d. per gallon, and a lower quality at 10d. to 11d. On the 19th., the latest date upon which we have any report, lime juice was stated to be in good demand at even rates, fresh arrivals keeping the stocks up. Good West Indian at this sale was sold without reserve at 9 $\frac{1}{2}$ d. per gallon. Good West Indian tamarinds were disposed of at 13s. per cwt. Four parcels of papain were also offered, the price quoted being 8s. 6d.

In closing it may be again of interest to note that fair bright Tripoli strip orange peel was quoted at the beginning of the month at 6d. per lb. and Maltese ringlets at 4 $\frac{1}{2}$ d.

Canada.

Mr. J. Russell Murray has forwarded the following review, dated August 10, 1905, of the position of West Indian products on the Canadian market :—

July business was unmarked by any special features, but continued good throughout the month. The crop reports continue to be satisfactory and a large wheat crop is anticipated, which will ensure a good demand for the 'fall' trade.

SUGAR.

Another month of frequent sharp fluctuations, largely caused by speculative interests with several large failures at the Paris centre, has reacted on cane sugars causing a decline for the month in London of 1s. 9d. The only feature of interest is the strong holding of Cuban sugars for the New York market, which has caused American buyers to purchase 30,000 tons of Java sugar in London, England. Cane sugars have advanced $\frac{1}{4}$ c. in New York for 96° centrifugals during July, and refined grades were advanced 10c. on August 2. Refiners report granulated heavily oversold. The Montreal market is stationary. Muscovado sugar continues in heavy stock; this, however, will see a reduction as soon as the grape harvesting begins towards the end of August. Molasses sugars are slow of sale. The sale at auction of about 2,000 tons 96° centrifugal sugar, slightly damaged per S.S. 'Yoruba' drew a few buyers who paid \$2.50 to \$2.72, the larger proportion realizing \$2.66, duty paid.

MOLASSES.

Trade has not shown any activity. Barbados have been offered at 31c. in 100-puncheon lots; buyers, however, are fairly well stocked. Antigua and Northern Islands stocks have been well taken up and, on the whole, are finding readier buyers; the general quality has been improved on.

COCOA-NUTS.

Demand continues very slow for the fruit trade, manufacturers being the sole buyers during this season. New York prices continue low, and locally there is no change to record.

SPICES.

Enquiry for 'fall' shipments for the canning industries has begun. Pimento is quoted at an advance. Ginger is firm. Cloves steady. Nutmegs, no change.

BANANAS.

A shortage of supplies has advanced prices, but the market continues under a close control.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, who arrived in Jamaica on August 4, was present at the inauguration of the first course of lectures to distillers at the Government Laboratory on August 15, and gave a short address.

On August 16, Sir Daniel attended the half-yearly meeting of the Jamaica Agricultural Society and spoke upon the cotton industry and the prospects of rubber planting. A short summary of this address is published elsewhere in this issue.

The Imperial Commissioner is expected to return to Barbados in the R. M. S. 'La Plata' on Thursday, September 21.

MARKET REPORTS.

London,—August 17, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 11, 1905; and 'THE PUBLIC LEDGER,' August 12, 1905.

ALOE—Barbados, 15/- to 45/-; Curaçoa, 18/- to 50/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/6 per lb.
BEES' WAX—£7 10s. to £7 15s. per cwt.
CACAO—Trinidad, 55/- to 63/- per cwt.; Grenada, 47/- to 49/- per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 40/- to 41/- per cwt.
COTTON—West Indian, medium fine, 6'55d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
ORANGES—Jamaica, 17/6 to 19/- per box.
PINE-APPLES—Jamaica, 10d. to 1/- per pine; Antigua, 16/- per barrel.
FUSTIC—£3 5s. to £4 per ton.
GINGER—No quotations.
HONEY—16/- to 22/- per cwt.
ISINGLASS—West Indian lump, 2/3 to 2/7; cake, 1/2 to 1/4 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £18 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/7 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—No quotations.
NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.
NUTMEGS—No quotations.
PIMENTO—2½d. to 2½d. per lb.
RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.
SUGAR—Yellow crystals, 17/6 per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 12/- to 15/- per cwt.
SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—August 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

BANANAS—No quotations.
COCOA-NUTS—Jamaica, \$22·00 to \$24·00; Trinidad, \$19·00 to \$21·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
LIMES—Jamaica, \$6·00 per barrel.
MOLASCUIT—Demerara, \$1·32 per 100 lb.
MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 20c. per lb.
ORANGES—No quotations.
PIMENTO—Jamaica, 5c. to 5½c. per lb.
PINE-APPLES—No quotations.
SUGAR—Grey crystals, 96°, \$2·60 to \$2·85 per 100 lb.
—Muscovados, 89°, \$2·10 to \$2·35 per 100 lb.
—Molasses, 89°, \$1·85 to \$2·10 per 100 lb.
—Barbados, 89°, \$1·95 to \$2·10 per 100 lb.

New York,—August 18, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11¼c. to 12c.; Grenada, 11¼c. to 11½c.; Trinidad, 11¼c. to 12c. per lb.; Jamaica—No quotations.
COCOA-NUTS—Jamaica, \$28·00; Trinidad \$24·00 to \$26·00 per M.
COFFEE—Jamaicas, 8½c. to 11c. per lb. (ex store).
GINGER—Jamaica, 7c. to 8½c. per lb.
GOAT SKINS—Jamaicas, 57c. per lb.
GRAPE FRUIT—No quotations.

MACE—29c. to 32c. per lb.
NUTMEGS—West Indian, 80's, 22½c.; 110's, 14½c.; 130's, 11c. per lb.
ORANGES—No quotations.
PIMENTO—4¾c. per lb.
PINE-APPLES—No quotations.
SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—August 26, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·00 to \$4·12 per 100 lb.
CACAO—\$11·00 to \$11·05 per 100 lb.
COCOA-NUTS—\$15·00 per M. for husked nuts.
COFFEE—\$10·00 to \$11·00 per 100 lb.
HAY—87c. to \$1·10 per 100 lb.
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Special cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.
ONIONS—Madeira, \$2·24 per 100 lb.
POTATOS, ENGLISH—Bermuda, \$3·66 per 160 lb. (retail).
RICE—Ballam, \$3·90 to \$4·40 per bag (190 lb.); Patna, and Seeta, \$3·10 to \$3·20; Rangoon, \$2·50 to \$2·55 per 100 lb.
SUGAR—Yellow crystals, \$4·25; Muscovados, 89°, \$1·80 per 100 lb.

British Guiana,—August 24, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. per lb.
CASSAVA STARCH—\$5·00 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—Rio and Jamaica, 13¼c. to 13¾c. per lb. (retail).
—Creole, 12c. per lb.
DHAL—\$3·75 to \$3·90 per bag of 168 lb.
EDDOES—80c. per barrel.
MOLASSES—No quotations.
ONIONS—Madeira, 2½c. to 2¾c.; Tenerife, 1¾c. to 2c. per lb. (retail).
PEA NUTS—American, 5½c. per lb. (retail).
PLANTAINS—16c. to 32c. per bunch.
POTATOS, ENGLISH—Tenerife, 2¾c. per lb. (retail).
POTATOS, SWEET—Barbados, \$1·68 per bag; \$1·68 per barrel.
RICE—Ballam, \$4·15 to \$4·20 per 177 lb.; Creole, \$3·90 to \$4·00 per bag.
TANNIAs—\$1·44 per barrel.
YAMS—Buck, \$2·28 per bag.
SUGAR—Dark crystals, \$2·40 to \$2·50; Yellow, \$3·40; White, \$4·50; Molasses, \$2·40 to \$2·50 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—August 24, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·25 to \$11·50; estates, \$11·50 to \$11·75 per fanega (110 lb.); Venezuelan, \$11·25 to \$11·60 per fanega.
COCOA-NUTS—\$20·00 per M., f o b.
COCOA-NUT OIL—67c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 10c. per lb.
COPRA—\$2·70 to \$2·80 per 100 lb.
ONIONS—Stringed, \$2·00 to \$2·20 per 100 lb. (retail).
POTATOS, ENGLISH—\$2·10 to \$2·25 per 100 lb.
RICE—Yellow, \$4·25 to \$4·50; White, \$4·50 to \$5·60 per bag.
SUGAR—White crystals, \$4·00 to \$4·50; Yellow crystals, \$3·00; Molasses sugars, \$2·50 to \$3·00 per 100 lb.



A FORTNIGHTLY REVIEW

OF THE

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West Indies and the Colonial Exhibition.

ELSEWHERE in these pages particulars are given as to the awards made in the West Indian Court as the result of the judging of the exhibits at the Colonial

and Indian Exhibition at the Crystal Palace. The announcement of these awards will be read with considerable interest throughout the West Indies. More detailed information is to be found in the last issue of the *West India Committee Circular*.

The honour of receiving the special gold medal for the best collective exhibit falls to Jamaica. The task of awarding this medal was entrusted to Mr. W. G. Freeman, Superintendent of the Colonial Economic Collections at the Imperial Institute, whose interesting descriptive articles on the several exhibits have appeared in the *Agricultural News*. The marks awarded by him were as follows: (1) Jamaica, 97 per cent.; (2) Trinidad, 84 per cent.; (3) Barbados, 78 per cent.; (4) Grenada, 37 per cent. Jamaica well deserves her success in winning the gold medal. It will be seen, however, that Trinidad and Barbados made close running. These three colonies are to be congratulated upon the excellent show made by them.

Turning now to the general awards, each of these three colonies secured a grand prize for her general exhibit, while Trinidad has the distinction of securing an additional grand prize, which was awarded to the Botanical Department for an exhibit of kidney seed-cotton. To Jamaica thirty-five medals were awarded, thirty-one to Trinidad, while Barbados secured twenty-five. The success which attended the exhibits of the Trinidad Botanical Department deserves special mention. It will be seen from the summary published elsewhere that Mr. Hart's department secured no fewer than seven medals, in addition to the grand prize for cotton already referred to.

While the West Indies as a whole are to be heartily congratulated upon being so well represented at this important exhibition and obtaining so large a number of awards, special acknowledgement must be made of the valuable work done by the Secretary of the West India Committee and the Commissioners of the various colonies represented, as well as by the local committees (upon which the important work of collecting and packing the exhibits fell), all of whom have spared no pains to make the West Indian Court a great success.

The great importance attached to this exhibition by the Imperial Department of Agriculture has already been given expression to in the columns of the *Agricultural News*. When steps were first taken by the West India Committee to secure the adequate representation of these islands at this exhibition, the opinion was freely expressed in certain quarters that no useful purpose would be served, and in one or two instances no official action was taken. The view taken by this Department may be summed up in the following extract from an editorial article in the *Agricultural News* (Vol. IV, p. 130): 'It is generally recognized that the value of these exhibitions lies in the promotion of trade, and it is mainly with the view of promoting trade between the West Indies and the Mother Country that exhibits are being sent from the various colonies.'

If proofs were needed of the beneficial influence of such an exhibition, many instances might be mentioned of new interest being aroused in West Indian products. The exhibition has been very widely attended and has consequently succeeded in awakening interest in the West Indies, their advantages as a tourist resort, their diverse and manifold products, and their trade possibilities. This may reasonably be expected to have the effect of increasing the tourist trade (which has already assumed considerable dimensions in Jamaica), as the beauties of the islands, shown by many fine photographs, become better known. In connexion with the trade of these islands in new products, the results of the exhibition are likely to be, perhaps, more immediate. The inquiries already being made with regard to West Indian commodities confirm the opinions already expressed as to the value of such exhibitions. Reference might, perhaps, be made to one instance, which will serve to show what can be done in this direction, if full advantage be taken of the opportunities afforded. A letter in the *Grocer*, calling attention to the superiority of limes over lemons, together with an adver-

tisement inviting grocers to obtain sample orders for limes called forth upwards of 100 orders, which are expected to result in at least fifty regular customers.

It is therefore confidently anticipated that, mainly as a result of the prominence accorded to the West Indies at the Colonial Exhibition, a much-needed stimulus will be given to the trade in many products between the West Indies and the Mother Country. If this hope be realized, all who have participated in the successful elaboration of the West Indian Court will, it is certain, consider themselves amply rewarded for their labours.



SUGAR INDUSTRY.

Manufacture of Levulose.

Tropical Life for August has the following note on a new process for manufacturing levulose or 'fruit sugar' from chicory roots:—

Mr. Sigmund Stein, the sugar expert of Liverpool, is said to have discovered a way of obtaining a sweetening substance, called levulose, by a purely mechanical process and without the use of chemicals, from chicory roots. This may lead to chicory being cultivated on a large scale in England, where it used to be grown fairly extensively near the city of York. Levulose is said to be six times sweeter than sugar obtained from cane or beet, and up to the present discovery was obtained from dahlia roots and sold at 6s. per lb., whilst, by Mr. Stein's process, it is thought possible that it would be sold at 6d. per lb. and still leave a good profit. If this is so, levulose will cut out many of its competitors, especially for sweetening champagne and aerated waters. The product is also called 'fruit sugar' and seems to be of the nature of honey.

Cuba.

The following information is extracted from an article on the Cuban sugar industry in the *Monthly Summary* of the U. S. Department of Commerce and Labour:—

Sugar is raised pretty generally all over the island, but the bulk of the product comes from the four central provinces—Havana, Matanzas, Santa Clara, and Puerto Principe. The plant flourishes luxuriantly as a rule, with comparatively little care or encouragement, and replanting becomes necessary only once every ten or fifteen years, on an average, so that agriculturally the crop is raised easily and cheaply; but the preparation of the crop for market is expensive in comparison, involving, as it does, hard labour in harvesting, the building of grinding mills, the purchase of costly machinery for making the sugar and for handling and transporting the product, the expenses of shipment, etc. The cost of raising a pound of sugar in Cuba may be said to be, speaking roughly, 1c., and the cost of manufacturing and transporting it to sea-board, under present conditions, 1c. more, so that the total cost of production of sugar in

Cuba, from the planting to the shipment at Havana, is about 2c. per lb.—not less than that, and perhaps on the average a little more. In the old times the cost was much greater. It is only within a comparatively recent period that sugar could be produced in Cuba, or anywhere else, for anything like that amount of money. In the case of Cuba, this low cost has been made possible of late years by the application of improved machinery and methods of cultivation and manufacture, by the improved conditions of the local labour market, by the cessation of strife and war, and by the abolition of the oppressive taxes and inequitable tariff restrictions imposed upon the Cubans for many generations by their former rulers. The new era of improvement has only just begun; and it is the concurrent opinion of all the best-informed observers that with the additional improvements which may be certainly expected soon to follow—the reconstruction of the plantations ravaged by war, the establishment of new ones, the liquidation of old loans and other debts incurred under the former régime, and the more general adoption of up-to-date machinery and industrial methods—the cost of production will be still further reduced. Improved roads and transportation facilities will probably also reduce the cost of transportation.

It is also worthy of consideration that, although nearly the whole island is well suited for the successful raising of cane sugar of the best quality, the largest crop ever produced on the island—that of 1894—was raised on plantations covering about 2,000,000 acres, or only about one-fourteenth of the total acreage of Cuba. Owing to the terrible devastation wrought during the years of the recent revolution, many plantations were abandoned or greatly crippled, and the recovery from these ravages is by no means yet complete, so that the present sugar acreage is somewhat less than the acreage of 1894. Considering this fact and also the other fact, that without doubt at least 5,000,000 acres of the island might quickly and easily be turned into first-class sugar plantations, in addition to the plantations already existing and in operation, and granting that all these plantations be managed on the most approved modern systems, the imagination is dazzled by the contemplation of what Cuba would be capable of doing in the sugar-producing line in the near future.

The improvements that have been gradually introduced in the process of sugar production in Cuba during the last few years or decades include the introduction of steam power in the fields and in the mills, labour-saving machines of various kinds, improved furnaces, clarifiers, grinding machines, defibrators, defecators, vacuum pans, centrifugal separators, and other modern sugar machinery, cane carriers and railway tracks through the fields for moving the crops to the mills, chemical laboratories, cane loaders and unloaders, electric-light plants in the mills, and a large variety of novel improvements, tools, fertilizers, and systems of cultivation.

As is commonly the case in agricultural operations everywhere, the size and quality of the cane crops vary greatly according to the fertility of the soil and the ability of the planter. The usual range is from 12 to 50 tons of canes for the yield of 1 acre. The average is about 25 tons of cane, or about $2\frac{1}{2}$ tons of sugar, per acre. The plant matures in the autumn or early winter, according as it is early or late planted, and is harvested and ground all along through the months from December to May.

In considering the figures as to the acreage of the cane plantations of Cuba, it must be borne in mind that not by any means the whole area of these plantations is devoted to cane culture. The larger part of every plantation, in all probability, is utilized for building sites, gardens, the raising

of vegetables, fruits, tobacco, and other crops besides sugar, pasturage for cattle, the growth of timber, etc. At the same time it is essentially a sugar plantation, as sugar production is its main activity and main source of revenue. So, when it is stated as above, that the sugar crop of 1894, amounting to little over 1,000,000 tons, was raised on about 2,000,000 acres, the meaning is that it was raised on plantations covering that acreage. In point of fact the actual acreage of the cane fields themselves was only about 400,000 or 450,000 acres. A crop of 1,000,000 tons raised on 400,000 acres, as will be seen, gives an average yield of $2\frac{1}{2}$ tons of sugar an acre.

The by-products of sugar-cane—molasses and rum—constitute a considerable source of income to the sugar producer. They are produced from the juice of the cane as it is extracted at certain stages of the sugar-making process, and the molasses output in particular is of material value to the sugar planter. The rum product is comparatively small and mainly destined for home consumption, but molasses are exported to a considerable extent.

NATURE STUDY.

In the following extracts from his annual report, the Inspector of Schools for British Guiana makes reference to the provisions of the new education code. It will be seen that greater prominence is to be given to object-lessons and nature study:—

I am firmly convinced that it is an improvement if only for the reason that a little hygiene is introduced and object-lessons take an important place. What is more important in the primary school than a little knowledge of how to preserve health? Herbert Spencer says: 'As vigorous health and its accompanying high spirits are larger elements of happiness than any other things whatever, the teaching how to maintain them yields in moment to no other whatever.' Are object-lessons of any importance? Again Spencer answers: 'The rote system, like all other systems of its age, made more of the forms and symbols than of the things symbolized. To give the net product of inquiry without the inquiry that leads to it, is found to be both enervating and inefficient. General truths to be of due and permanent use should be earned.'

To sum up, the Code of 1904 is a great stride in the right direction, in that it introduces hygiene, object-lessons, and nature study into the school curriculum. In the words of the English code: 'The purpose of the public elementary school is to form and strengthen the character and to develop the intelligence of the children entrusted to it, and to make the best use of the school years available, in assisting both girls and boys, according to their different needs, to fit themselves, practically as well as intellectually, for the work of life. With this purpose in view it will be the aim of the school to train the children carefully in habits of observation and clear reasoning so that they may gain an intelligent acquaintance with some of the facts and laws of nature; to arouse in them a living interest in the ideals and achievements of mankind, and to bring them to some familiarity with the literature and history of their own country; to give them some power over language as an instrument of thought and expression, and, while making them conscious of the limitations of their knowledge, to develop in them such a taste for good reading and thoughtful study as will enable them to increase that knowledge in after years by their own efforts.'



WEST INDIAN FRUIT.

SHADING PINE-APPLES.

The Curator of the Botanic Station at Dominica makes the following suggestions with regard to the desirability of shading pine-apples during the fruiting period:—

An experiment was made in shading pine-apple plants from the time of flowering until the fruit was ready to be cut. The effect was very marked, the shaded plants being healthier and the fruits more perfect in shape than those unshaded.

Probably pine plants would benefit if grown under light shade from the time of planting, as in Florida, but in any case it is necessary to shade during the fruiting period, if the best results are desired. To shade beds of plants is not an expensive matter. Forked sticks, bamboos, and palm leaves are generally easily obtainable and are very suitable for the work.

FRUIT TRADE OF CUBA.

The following brief review of Cuba's fruit trade is extracted from the *Monthly Summary* of the U.S. Department of Commerce and Labour for May:—

The fruit exports of Cuba are not as large as formerly, owing to the competition of Florida and California, and to the decrease in production on account of the war and the old systems of taxation and export tariffs, which threw a wet blanket over all Cuban industries. But during the last two or three years there has been a great revival in the fruit export trade. The island abounds in many kinds of the most delicious fruits, which grow spontaneously and require little care or labour. Among them are oranges, limes, lemons, bananas, pine-apples, strawberries, grapes, melons, peaches, apricots, olives, figs, dates, cocoa-nuts, mangos, tamarinds, guava, and several varieties not so well known in northern communities. These Cuban fruits are among the finest specimens of their class grown anywhere, and the oranges, bananas, and pine-apples, in particular, are of unexcelled flavour.

The banana shipments from Cuba to the United States, as all are aware, are extensive, and they have been so even in the years of Cuba's greatest depression; but since the war they have largely increased.

The figures of the Cuban pine-apple export trade of the last few years are yet more striking. About \$50,000 worth of pine-apples were exported in 1899, and \$250,000 worth in 1901; while the increase since then has been truly wonderful. The value of the exports of pine-apples for 1903 and 1904 was \$729,720 and \$620,231, respectively.

VARIETIES OF BANANAS.

In answer to a correspondent's query, Mr. J. R. Jackson, A.L.S., writes as follows in the *Gardeners' Chronicle* in regard to the different varieties of bananas to be found in the English market:—

The differences in the size and quality of the banana fruits imported from Jamaica and the Canary Islands is a question that has recently been asked by a correspondent. In reply, I would say that the Jamaica and Costa Rica bananas are the produce of *Musa sapientum*, which grows to a height of some 20 feet or more, and is found in most tropical countries. It is now cultivated under many varieties, that grown in Jamaica being known as the Gros Michel. The bunches and individual fruits are much larger and have thicker skins than those grown in the Canary Islands, which are the produce of *Musa Cavendishii*, a plant of much more dwarf habit, seldom exceeding 5 to 6 feet in height, and producing smaller bunches and smaller fruits, which are thinner-skinned than the former and possess a more delicate flavour. It is known as the Chinese banana, and besides the superior flavour of the fruit it has many characters to recommend it for general cultivation. This form is now being extensively grown at Barbados and shipped to this country in increasing quantities as Barbados bananas.

PAPAIN.

It is stated in the *Transvaal Agricultural Journal* that several correspondents have lately made inquiries respecting the commercial properties of the papaw. In order to ascertain the prospects of the papain industry, a letter was addressed by the Transvaal Department of Agriculture to the American Ferment Company, New Jersey, U. S. A., to which the following reply was received:—

Replying to yours of the 8th. instant, we beg to say that there is such a vast area in lands of the world suitable for production of papaw, and the amount of Papaya juice needed is relatively so small, that we doubt if it would pay the people in your locality to take it up.

Thus far, there has been no improvement over the West Indian plan of scoring the rind, and receiving the juice in calabashes. It is not received in water, as that would utterly ruin it. After the rind is scored, the greater part of the juice coagulates on the surface of the 'melon', and is easily scraped off into the calabash. In fact, the whole mass coagulates, after which it is dried in the sun by some means. It should be dried in a temperature not to exceed 150° F.



COLONIAL AND INDIAN EXHIBITION.

List of Awards.

The last issue of the *West India Committee Circular* contains full particulars of the awards made in connexion with West Indian exhibits at the Colonial and Indian Exhibition, 1905. The following extract is of interest:—

The award to Jamaica of the coveted gold medal, so generously presented by the Direct West India Cable Co. for the best collective exhibit, irrespective of size, is a matter for the heartiest congratulation to that colony, to Mr. John Barclay and Mr. Frank Cundall, the two Commissioners, to the Local Committee, and indeed to the enlightened press of the island, who in the face of what always appeared to be mistaken opposition, succeeded in bringing matters to a successful issue, and secured the representation of Jamaica at an exhibition, which, before it closes, bids fair to be visited by considerably over a million people. Trinidad ran Jamaica close, and Barbados was only six points behind, and to these colonies, and to the other recipients of awards, we must convey our congratulations. We should go even further than this, and convey our congratulations to Grenada and to all who have participated in the present display, believing, as we do, that the beneficial results, though they may not in every instance be immediate, will at any rate be lasting. Already the exhibition is awakening in this country a greater interest in West Indian produce than has been witnessed for many years past, and this is evinced in a marked degree by the inquiries which we are continually receiving at the West India Committee Rooms regarding the various islands and the produce which comes from their fertile soil. . . . A purveyor of Jamaica cigars states that he is already receiving many inquiries from people who would otherwise not have had an opportunity of smoking the fragrant weed of the erst-while land of sugar and rum, and then again we have placed on record our own experience in connexion with limes. A consignment of limes was exhibited, and in view of the shortage of lemons, a letter was addressed by the Secretary of the West India Committee to a leading trade paper, inviting grocers to share in a trial shipment with a view to bringing before the notice of their customers the merits of this most excellent citrous fruit, and almost by return of post nearly 100 orders were received from different parts of the country, and indeed, we might add, other countries, for one actually came from Denmark. The moral from this is easy to draw. What can be done for limes can also be done for other West Indian produce, and if West Indians will avail themselves of such opportunities as are afforded by this exhibition, the results will be incalculable.

The following is a summary of the awards secured by the West Indies:—

BARBADOS.

- Grand Prize (for general exhibit).
- 12 Gold Medals.
- 12 Silver Medals.
- 1 Bronze Medal.

JAMAICA.

- Gold Medal (presented by the Direct West India Cable Co. for best collective exhibit).
- Grand Prize (for general exhibit).
- 17 Gold Medals.
- 15 Silver Medals.
- 3 Bronze Medals.
- 7 Hon. Mentions.

TRINIDAD.

- Grand Prize (for general exhibit).
- Grand Prize (for Kidney seed-cotton).
- 15 Gold Medals.
- 11 Silver Medals.
- 5 Bronze Medals.
- 19 Hon. Mentions.

GRENADA.

- 1 Gold Medal.
- 1 Silver Medal.
- 1 Hon. Mention.

MISCELLANEOUS AWARDS.

Mr. Algernon E. Aspinall obtained a Grand Prize for West Indian picture post-cards. Five gold medals and one silver medal were also awarded to various firms showing miscellaneous exhibits of West Indian produce.

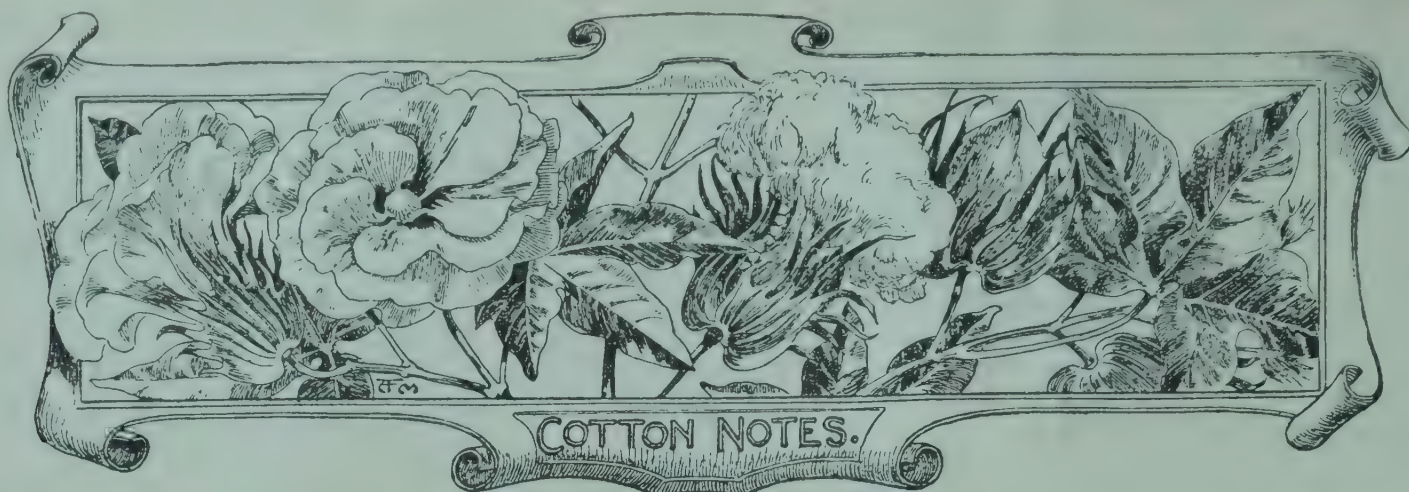
It may also be mentioned that the Botanical Department in Jamaica obtained a gold medal for 'Fruits and living economic plants,' and a gold medal for 'Sea Island ginned cotton.' To the Botanical Department in Trinidad were awarded a gold medal for bananas; for coffee a silver and a bronze medal and an hon. mention; for cacao (River estate) an hon. mention; for cassava and other starches a silver medal; for cotton a grand prize, a gold medal, and an hon. mention; a gold medal for essential oils; and a gold medal for bamboos.

GERMINATING PARA RUBBER SEEDS.

The following note on germinating seeds of Para rubber (*Hevea brasiliensis*) is taken from the proceedings of the Agri-Horticultural Society of Madras, October to December 1904:—

In these gardens we have been in the habit, for the last three years, of germinating seeds to supply to the planters on the Nilgiris. The first year, the plan of sowing direct in pots and pans was adopted with very poor results. In the second and third years, a system on the plan of a seed-tester was tried. Platforms were erected about 4 feet from the ground, and on these old sacking was stretched (coir matting would be preferable). Over these was placed a little powdered charcoal to assist in retaining moisture. The seeds were then placed on this and covered with more sacking and the whole kept damp by occasional watering. The seeds were examined every day and as soon as any showed signs of germinating they were removed and potted off. Seventy-five per cent. of a case of seeds received from Peradeniya germinated after this treatment in spite of having been delayed by the Madras Customs authorities for over three weeks.

This plan may be well worth trying in cases where seeds have been long delayed in transit to the estate.



WEST INDIAN COTTON EXPORTS.

Under the above heading the *Morning Post* of August 12 has the following article on the West Indian cotton industry:—

Only three or four years have elapsed since the Imperial Department of Agriculture for the West Indies undertook the experimental cultivation of cotton with the object of ascertaining whether the industry could be recommended to the planters as a profitable one. The experiments were entered upon with confidence, because originally cotton formed one of the principal sources of wealth, the islands being, in fact, the home of the most valuable variety of cotton grown—now known as the Sea Island variety. So encouraging were the results of the experiments that the sugar planters lent a willing ear to the advice that they should embark upon cotton as a subsidiary industry. Considering the brief interval since the reintroduction of cotton growing, the progress made has been very remarkable, every season witnessing an extensive increase in the acreage devoted to the industry. The Imperial Commissioner of Agriculture has collected statistics relating to the export of cotton from the islands during the first half of the present year, which were published in the *Agricultural News*, Vol. IV, pp. 278-9.

COTTON CULTIVATION IN JAMAICA.

In the *Bulletin of the Department of Agriculture*, Jamaica, for August, Dr. H. H. Cousins treats as follows of the subject of a suitable rotation of crops for cotton and other matters connected with the cultivation of cotton:—

I fully agree with the recommendation not to ratoon cotton over the first year, having observed serious ravages on young cotton from caterpillars derived from old plants that should have been destroyed at the end of the year.

The gist of the matter to my mind is as follows:—

Plant the cotton at the natural season, so that rains may keep it growing until it has attained size and then dry weather will follow for the crop. Cotton planted late is stunted and unhealthy. It is very subject to fungoid disease and is severely attacked by caterpillars. It is very apt to ripen seed prematurely, so that when the rains come the seeds germinate in the green pods and the whole contents turn black. I am speaking from personal observation here of a large area planted late with the above result.

Cotton planted at the right time will ripen in about five months, and if the old plants be trimmed back, a second flush will follow and a picking of second-crop cotton be obtained so that the whole can be cleared off the ground in eleven months. I consider that it is very desirable to uproot

the old plants and, having gathered them into heaps, to burn them, so as to destroy the eggs, caterpillars, and cocoons of the cotton worm. The land can then be prepared for the next planting. Local experience as to corn planting seems to be a safe guide as to the correct time to plant cotton. This permits of a narrow margin and must be strictly complied with if failure is to be avoided.

Under these conditions, I think the lands in Vere and St. Catherine, where cotton has grown well this year, would grow it in continuous annual crops for a long period of years without rotation of crops.

With reference to rotation crops for cotton, it must be recognized that corn (maize) does not pay to grow in the plains. Leguminous crops can only be grown as snatch crops. Tobacco can only be grown on a limited area, owing to the great demand for labour. Further, tobacco barely pays expenses in Jamaica.

Cassava would do admirably, but here again there must be a factory on hand to deal with it. I have been trying to establish data as to the cassava industry, and there is no doubt it would pay even better than cotton.

Under present conditions, I think cow peas might be planted between the rows of cotton after the first crop and be ploughed in when preparing for the new planting. It should be remembered that our cotton lands north-west of the irrigation area in St. Catherine and the light lands in Vere are practically virgin soil and very rich in fertility. Ten crops should not exhaust these lands.

HIGH PRICE FOR ST. VINCENT COTTON.

Mention was made in the *Agricultural News* (Vol. IV, p. 274) that the cotton from Petit Bordel estate in St. Vincent had fetched the highest price recorded from the West Indies, viz., 1s. 6d. per lb. It has since been reported by Mr. Sands that another bale of St. Vincent cotton fetched the same price. It is interesting to record that this bale was grown by Hugh Browne, who completed his training at the Agricultural School last year.

Mr. Sands states:—

During the planting season Browne cleared and cultivated a small plot, not quite $\frac{1}{4}$ acre in area, in cotton at Stubbs Village on the Windward Coast. The seed he planted was the Rivers' selected seed obtained through the Agricultural Department. Browne did all the work of planting to reaping in his spare time.

From the plot he obtained, when ginned, 142 lb. net of lint, which sold at the price named above. After deducting all charges he received nearly £10.

PIMENTO GROWING IN JAMAICA.

The following interesting account of the cultivation of pimento (*Pimenta officinalis*) in Jamaica, by Mr. Adam Roxburgh, is extracted from Mr. Cundall's *Jamaica in 1905*, which was reviewed in the last issue of the *Agricultural News* (Vol. IV, p. 286):—

This is a very pungent spice, and is known as 'Jamaica pepper' and 'allspice.' The tree, which is of moderate size, growing to a height of some 30 or 40 feet, with a circumference at the base of the trunk of about 3 feet, is a species of myrtle. The wood is covered with a greenish-grey bark, which is smooth and shining in appearance; the leaves are a dark and very glossy green, and when crushed in the hand emit a strong aromatic odour. The general appearance of the tree is very striking, owing to the colour of the bark, which causes every tree to show up through the dark green of the leaves, with a peculiarly beautiful effect. It has been thought that Jamaica is the only place where this spice is to be found, but this is not so. It has been found in parts of South America, but, owing to the expense of the gathering in those places, it would prove a very unprofitable article of export. In Jamaica, however, where labour of a kind is comparatively cheap, we can gather in the spice at a price which allows of considerable profit to the grower and yet gives the labourer a very fair wage for his time. Another erroneous idea respecting pimento is that it will not grow if planted by hand, but must be dropped by birds on the ground. The birds certainly are very fond of the ripe berries, and it is a fact that nearly all our pimento trees are planted in this way; but it is a great mistake to suppose that it is necessary for the seed first to be planted by a bird, for if a ripe seed is washed and cleared of the external pulp and then planted, it grows readily. The pulp, however, must be removed, for, if not, it dries and forms a hard, leathery skin, which will be in the ground for an indefinite time and prevent the seed from springing. There are two kinds of pimento trees, viz., the fruitful or bearing tree, and the unfruitful, or, as it is commonly termed, the male tree. They are very much alike in appearance, and can only be distinguished by experienced eyes. It is held by botanists that the so-called 'male' trees are not necessary to the fructifying of the bloom on the bearing trees, and that they are simply barren trees of no use to the grower and, excepting when they are useful as shade trees, are better out of the way. Many growers, however, find it difficult to reconcile this theory with actual experience, holding that when all the 'male' trees are cut out, the yield of the other trees is not equal to what it had been before the axe was put to work.

A pimento tree under favourable circumstances begins to bear when about eight or ten years old, but it is not in full bearing till about eighteen or twenty years. It will go on bearing if properly treated for a very great number of years—longer than the average life of a man. The berry, which is the marketable product of the tree, and is the 'allspice' of commerce, is a small, round fruit about the size of an ordinary black currant. They grow in clusters on the tree, and are in the best condition for picking when full, but not ripe. When ripe they are of a glossy, black colour, sweet and very spicy in flavour, in fact, very pleasant to the taste. The full but unripe berry is more spicy and somewhat peppery, and astringent. The process of gathering is carried out by sending a lad up the tree with a long stick with a crook at the end. With this he catches the long outer branches, and, bending them back till within his reach, he snaps off the smaller ends where they are about the thickness of an ordinary walking cane, and throws them down to the

ground. In this manner, he breaks off all the small branches upon which he finds the pimento berries hanging, and at the same time effectively prunes the tree; without such pruning the tree will not bear regularly. The tree thoroughly 'broken,' women and children gather up the branches, and sitting down they pick off the berries into baskets, taking care to winnow out all the stems and leaves, and leave only the berries. At the close of the day the baskets, full with pimento, are all brought to the barbecues, and then measured; the quantity picked by each person being entered up in the barbecue book, the picking being paid for at the end of the week.

The barbecue is the place where the berries are dried and prepared for market. It is a large, paved court, the size depending on the average quantity of pimento picked on the property. It is sub-divided into 'beds' by a low banking so that the pimento picked on one day, and which has begun to dry, does not mix with the green, fresh spice of another day's picking. When a sufficient quantity has been thrown upon a 'bed,' it is spread out and exposed to the sun, a man with a wooden rake being employed to keep turning it over so that all sides of the berry may have the benefit of the heat. Pimento takes from six to ten days to cure in this manner. A good, dry breeze is a great help in the curing and quickens the process materially. Tarpaulins should be provided for every range of barbecues, for the pimento should not be allowed to get wet while the drying process is going on. The damp spoils the quality of the spice and affects the bright, brown colour, which is the chief point looked to by purchasers. The berries are known to be thoroughly dry when, upon taking up a handful and holding it firmly in the hand, a sharp, dry, crisp, rattling sound will be heard, if shaken near to the ear. When this is noticed, it can then be gathered up and stored, till the time comes when, the crop being over, it is passed through a machine for fanning out all dust and leaves, and then bagged ready for shipment.

The average production of pimento is about 50,000 to 60,000 bags of about 150 lb. weight per annum for the whole island. When sold in the island, the price is calculated per 100 lb., and the average price for the past five years has been 15s. per 100 lb. We have known pimento during the last twenty years as high as 40s. per 100 lb., and for a good many years 25s. to 28s. rules as the value. Plantation pimento will of course always fetch a higher price than settlers' produce, owing to the quality being superior—not from any fault on the part of the spice itself, but from the careless manner of curing on the part of the settlers, as a rule. St. Ann is the principal pimento-growing parish in the island, but St. Elizabeth, St. Mary, Trelawny, and Manchester produce large quantities also.

PREVENTING DECAY OF RIPE FRUIT.

In reference to the article on preventing decay of ripe fruit, which was published in the *Agricultural News* (Vol. IV, p. 277), Mr. J. H. Hart writes as follows to the *Mirror*:—

The mangos referred to were supplied by Trinidad, and I was in consultation with the author during my tenure of office as Commissioner at the Crystal Palace. I consider it a most important point. Formalin has for some years been used in this office as a preservative, and cacao pods preserved in it were on exhibition by this Department and by Messrs. Cadbury. It has not, however, been previously used for sterilizing or getting rid of the germs from edible fruits as now suggested.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

In the editorial in this issue reference is made to the success of the West Indies at the Colonial and Indian Exhibition. It is anticipated that a stimulus will be given to the trade in many products between these colonies and Great Britain. A summary of the awards secured by the West Indies is given on p. 293.

An interesting review of the progress made in Cuba in connexion with the sugar industry will be found on pp. 290-1.

Notes of special interest to cotton growers are published on p. 294.

The cultivation of pimento is an important industry in certain parts of Jamaica. The article on p. 295 is of interest.

It is desired to draw the attention of cotton growers to the article on p. 298 on 'Beneficial Insects in Cotton Fields.' It is of the greatest importance that growers should learn to recognize their insect friends.

A short note on the bud-rot of the cocoa-nut palm, which has been causing some loss in Trinidad, places the present knowledge of this disease before cocoa-nut growers. (See p. 299.)

On p. 303 there appears an account of the efforts that are being made in St. Vincent for the improvement of allotments in connexion with the Land Settlement Scheme.

Tenerife Onion Seed for Sale.

Messrs. Gardiner Austin & Co., of Barbados, as representing Messrs. Miller & Co., of London, who are extensively engaged in the onion industry in the Canary Islands, have in stock 3 cases of onion seed which they offer for sale at 3s. 6d. per lb. The seed is from this year's crop and is the white variety. Any person desiring this seed should communicate directly with Messrs. Gardiner Austin & Co., Barbados.

Cacao in the Virgin Islands.

Reference was made in the *Agricultural News* (Vol. III, p. 265) to a report by Dr. Watts on a tour in the Virgin Islands in July 1904, in which he pointed out the suitability of cacao growing as an industry for the peasant proprietary.

Since that time the cacao experiment plot at the Experiment Station has continued to thrive, and the last annual report on the station shows that there is some demand for cacao plants.

In a recent report Mr. Fishlock mentions that there is a very nice little plot of cacao near Soldiers' Hill, from which the proprietor shipped about 1½ bags last season. This, Dr. Watts writes, confirms his impression, founded on the experiment plot at the station, that cacao can be grown in the Virgin Islands, and it will be well to do everything possible to foster this industry. 'The conditions of the Virgin Islands are peculiar, the people, who are really a sea-faring race, not being accustomed to sustained agricultural efforts. They are much more likely to develop such industries as depend on tree crops, such as cacao and rubber, than crops requiring sustained efforts, as cotton, though the latter should have attention.'

Growing Tobacco under Shade.

In view of the promising experiments carried out at the Hope Experiment Station, Jamaica, in connexion with the growing of tobacco under shade, it may be of interest to review briefly somewhat similar experiments carried out in Porto Rico by the Tobacco Expert attached to the Agricultural Experiment Station. These are fully reported in Bulletin No. 5, 'Tobacco Investigations in Porto Rico during 1903-4.'

In an experiment occupying about $\frac{2}{13}$ acre 2,200 plants were set out under shade in rows 3 feet apart and 1 foot apart in the row. After curing, the tobacco was fermented, sorted, and graded by a local tobacco company. The results showed a total of 171 lb. of wrappers of different grades, 36 lb. of 'tripa capa,' and 21 lb. of 'tripa;' a total yield per acre of 1,482 lb. Samples of the light and medium wrappers were valued at \$2.50 and \$2.00, respectively, and one large factory offered \$1.50 per lb. average.

It is stated that last year 200 acres of tobacco were grown under shade, and the fact that the area will be extended to 300 or 350 acres during the present year indicates the belief that the enterprise will prove a financial success.

Supports for Vanilla.

The Annual Report of the Agricultural Instructor at St. Lucia, now in the press, contains interesting remarks on experiments in vanilla growing. Mr. Hudson states that the principal obstacle in the way of the successful cultivation of this product in St. Lucia has been the lack of a suitable bush as a support.

The trees generally recommended for this purpose, such as physic nut, calabash, hog plum, and Immortel, are difficult to keep under control in an extended cultivation. Mr. Hudson has found old Liberian coffee trees excellent for this purpose. At present prices Liberian coffee hardly pays the picking expenses, and the trees might with advantage be used as supports; they should be lopped at a height of 6 feet. To those who have no Liberian coffee trees growing, he can recommend the annatto, but not on very rich lands as they would be difficult to control.

St. Vincent Land Settlement Scheme.

There will be found on p. 303 an account of the efforts that are being made in St. Vincent to improve the allotments on the estates acquired by the Government under the Land Settlement Ordinance of 1899.

The scheme aims at preventing the exhaustion of the lands occupied by allottees by encouraging the preparation of compost and extending the use of artificial manures.

There were in June last 540 occupied allotments, and the holders of 400 of these had carried out the directions of the Agricultural Instructor with regard to making compost. Each of these 400 allottees is now to receive, free of cost, artificial manures sufficient for $\frac{1}{4}$ acre of land. Suitable manures are being provided for canes, for cacao, and for provisions.

It is anticipated that useful information will be obtained as the result of these manurial experiments.

Agricultural Industries of Gambia.

The ground nut is the principal product of Gambia, and the welfare of the colony depends entirely upon it. During 1904, according to the *Annual Report*, there was a falling off in the exports of no less than 2,041 tons, and of a value of £46,107. It is stated that this industry is bound to be subject to fluctuations, as so much depends upon the rainfall and the price of the nuts in France, to which country the majority of them are exported.

The efforts to establish a cotton industry in the colony have been unsuccessful, and it is feared that the cultivation of cotton is impossible, owing to the sandy character of the soil.

The year's export returns show increases in wax, palm kernels, and hides. The trade in hides is gradually developing, the value of the exports being £1,444 in 1904.

It is stated that the extension of agricultural industries is much retarded by the insufficiency of the population.

Ceylon Rubber Industry.

An article in *The Times* of August 21 contains interesting information on the growth of Ceylon's rubber industry. Twenty-nine years have elapsed since the first plants of the Para rubber tree (*Hevea brasiliensis*) went from Kew to Ceylon. These trees, now giants in the Government Gardens, have given seed which has helped to plant up many thousands of acres in Ceylon, Southern India, and the Malay Peninsula.

With the price of the beautifully clean Para rubber rising to 6s., it was inevitable that there should be a rush into planting. The new industry in the three kinds of rubber (but chiefly Para) covers now the equivalent of 40,000 acres, and the exports may this year reach 110,000 lb.

It is estimated that the total area of cultivated rubber in the world is 149,950 acres; of this area Ceylon accounts for 40,000 acres, the Malay Peninsula for 38,000 acres, and Africa 33,000 acres, while Tobago and the West Indies are estimated to have 1,000 acres.

In Ceylon the Para rubber tree flourishes from sea-level up to 3,000 feet. It is therefore to be expected that a great further development will take place.

Gathering Fruit for Market.

Fruit growers in the West Indies do not appreciate the necessity for the care that is required in gathering fruit from the trees. This is a matter to which attention has frequently been drawn in the various agricultural publications in the West Indies and by Agricultural Instructors in the course of their travels.

The point which it is specially desired to urge is this: Perishable fruits should never be *pulled* from the tree, but should always be stem-cut. This has, perhaps, now been fully realized by those who grow oranges on a large scale for shipment to England or the United States, but it is rarely one sees any trace of the stem on oranges gathered for the local markets, when the fruits are to be consumed soon after being gathered.

In the case of other fruits, such as, for example, the avocado pear, the necessity for following this practice is rarely realized; and yet this is one of the most delicate of the West Indian fruits. The slightest bruise is sufficient to cause the pear to rot in a very short time; it is even often much bruised by its own seed if carelessly shaken. The avocado pear is now in season, and one frequently has to throw away a considerable portion of the fruit in consequence of the decay that has started at the point of attachment of the fruit to the stem. The reason of this decay is that the fruits have been pulled from the tree; had they been stem-cut with a pair of shears, they could have been kept much longer and would have ripened evenly throughout.

Growers of these and similar fruits should realize that they should gather their fruit with the greatest possible care, even though these are intended for the local market only and not for shipment.



INSECT NOTES.

Citrus Pest at Montserrat.

It has recently been reported that the citrus plants at the Grove Station, Montserrat, have been suffering from the attacks of a beetle, which eats the leaves. In the absence of a detailed description, it is inferred that the report refers to the greyish weevil (*Epicaerus ravidus*), which has for several years been known to eat the leaves of young citrus plants at the Grove Station. This insect occurs on limes at Dominica, Antigua, and St. Kitt's, as well as in most parts of Montserrat, but has not, so far as is known, been considered a pest on any but young trees. The life-history is not known, but the larva is most likely a root-feeder, as in other nearly related species.

Handpicking is perhaps the best remedy, although, if the weevils occurred in large numbers, they might be jarred off into a cloth such as that described in the *Agricultural News* (Vol. III, p. 394). This method is used in Porto Rico in controlling the orange weevil (*Exophthalmus spengleri*), which is closely related to the species in Montserrat.

Beneficial Insects in Cotton Fields.

In a recent number of the *Agricultural News* (Vol. IV, p. 266) descriptions were given of the cotton aphid and the insects that feed upon it. The cotton aphid sometimes occurs in great numbers on the leaves of the cotton plant, and as each individual lives by sucking the juice of the plant, considerable injury may result to the plant. The aphid is, however, generally held in check by beneficial insects. These insects are predaceous in their habits and voracious feeders, each individual eating a large number of aphids each day.

Unfortunately, cotton planters do not in all cases recognize these insects, and it is in the hope of creating a better understanding as to the useful insects found on the cotton plants that this matter is again referred to. Quite recently, a report was received at the office of the Imperial Department of Agriculture from a planter to the effect that

his cotton was being seriously attacked by several small insects, the worst of which was a small, red bug. A visit to the field in company with the planter revealed the fact that the small, red bug complained of was the red lady-bird (*Cycloneda sanguinea*), fig. 20, b. Another was the spotted lady-bird (*Megilla maculata*), fig. 20, a. Both these were very abundant, the red lady-bird occurring in numbers on nearly every plant. The larvae of

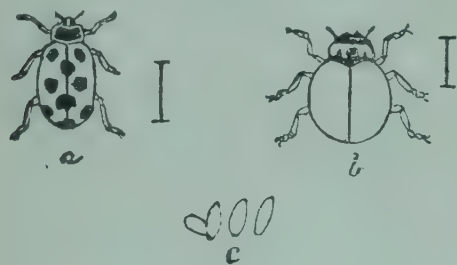


FIG. 20. LADY-BIRDS.

a., Spotted lady-bird (*Megilla maculata*); b., Red lady-bird (*Cycloneda sanguinea*); c., Eggs of lady-bird. All enlarged.

these insects were also present, and lastly the lace-wing fly (*Chrysopa* sp.). An energetic warfare had been instituted against all these insects, a large number of them having already been killed. The only evidence against them was that they were numerous and that the leaves of the plants showed signs of having been eaten.

So thoroughly had these friendly insects done their work that very few aphids were to be found. The holes in the leaves had been made by the cotton worm, but at that time very few worms were found, and no other leaf-eating insects were to be seen, in consequence, probably, of the fact that these fields had received an application of Paris green a few days before. The fears entertained by the planter that his cotton plants were being destroyed by the insects he reported were entirely groundless. The rôle played by each of these beneficial insects was carefully explained, and that particular planter will not again waste time and money in trying to exterminate from his cotton fields his insect friends.

Of the lady-birds the red one is generally much more numerous than the spotted one. It is of a blood-red colour, about $\frac{1}{4}$ inch long and $\frac{1}{5}$ inch wide. The spotted lady-bird is of a pinkish-red colour with black spots on its back. It is longer and narrower than the red one, a little more than $\frac{1}{4}$ inch in length and about $\frac{1}{6}$ inch in width. The larvae of these two species are much alike (see fig. 22, c.), the eggs being also much alike. The eggs are small, oval, orange-red in colour, and are to be seen on the leaves of the cotton plant.

The lace-wing (see fig. 21) is a small, green insect with gauzy wings. The body is about $\frac{1}{2}$ inch long, and the wings spread nearly an inch. These insects may be seen flying about in the cotton fields or walking about on leaves or



FIG. 21. LACE-WING FLY.
(Enlarged.)

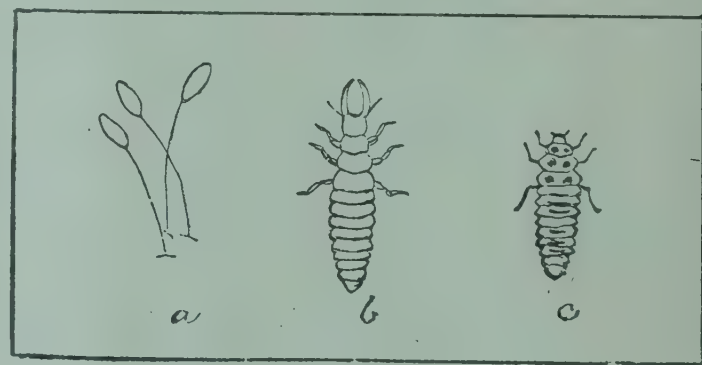


FIG. 22. EGGS AND LARVAE.

a., Eggs, and b., larva, of lace-wing fly; c., larva of lady-bird. All enlarged.

stems. The larva or grub is small, pointed behind, and is armed with a pair of long, strong jaws. The eggs of the lace-wing are small, white objects attached to a long stalk. (See fig. 22, a. and b.)

It is very important that these insects should be recognized by planters as beneficial and that they should not be killed. They do not eat the leaves nor in any way injure the plant.

BUD-ROT OF COCOA-NUT PALM.

Attention was first called to this disease during the American occupation of Cuba. In 1901, Mr. Busck was sent by the U.S. Department of Agriculture to Cuba, and subsequently reported upon the entomological aspect of the disease. Soon afterwards, Mr. Earle was sent to Jamaica to investigate it there, and his observations were published in the *West Indian Bulletin*, Vol. IV, p. 4. The disease has since been heard of as occurring on the mainland in Central America, so that it can be assumed to occur all round the Caribbean Sea. Information has now come to hand from Trinidad which points to its becoming epidemic in some parts of that island. On one estate alone over 2,000 palms have already been lost.

A few short notes on the general appearance of the disease may therefore be interesting; for, unless it is taken in hand, it must eventually destroy the cocoa-nut industry of the West Indies. The general symptoms of the disease appear to be the yellowing and fall of the outer leaves, the shedding of nuts and, later, the death of the whole crown. As to the origin of the disease, opinion seems to be divided: Mr. Earle states that the organism develops in the sweet coatings of all the young parts of the plant, thence eating its way into the sheathing bases of the petioles and attacking the flowering sheaths. Finally, it reaches the terminal bud or cabbage, which becomes involved in the vilest sort of bacterial rot, and the death of the palm quickly follows. Dr. Erwin Smith, who was later sent to Cuba, states that it is a disease of the undeveloped tissues of the central crown and stops promptly with the harder tissues of the palm.

The Hon. W. Fawcett, Director of Public Gardens at Jamaica, agrees with Mr. Earle, and has had remedial measures carried on under his supervision with the view of keeping the disease in check. Spraying with Bordeaux mixture has arrested the disease in several cases, when it has been applied before the disease has gone too far. This beneficial use of Bordeaux mixture points to the origin of the disease really being more or less superficial and not being so deep-seated as Mr. Earle and Mr. Smith assert. They seem to be convinced that bacteria are really at the root of the evil.

Bacteria, it is true, are often found in diseased plants in enormous numbers, but they are living only on tissues that have already been disintegrated and have decayed. An uninjured plant is impregnable to their attacks. The sole and only channels of communication between the interior of the plant and the outside world are the stomata, and these open into a closed system of air-filled intercellular spaces, which are shut off from the cells themselves. If bacteria, therefore, are washed into stomata, they find nothing but moist air, and bacterial spores cannot germinate without nutriment. Wounds on plants are due to three causes—(a) natural causes from wind, etc., (b) insects, (c) fungi. In the case of a wound caused by wind, etc., the open surface is soon shut off by the development of an impenetrable layer of cork below the wound, which, therefore, makes the entrance of bacteria to deeper tissues almost as difficult as in the case of an uninjured plant. Both fungi and fly larvae have been found in the parts longest diseased; but it is asserted by Mr. Smith that the advancing margin of the decay was occupied only by bacteria. The question therefore to be solved is: How have the bacteria got there? Until something definite is known about the way infection is carried on, no remedy can be suggested; for a disease can only be exterminated when attacked at the weakest time of its life-history. The seriousness of the disease in several of the West India Islands shows that only the most energetic action is likely to avail.

HURRICANE INSURANCE.

The following note on the scheme for insuring plantations against hurricanes in the West Indies, which has been drawn up by his Excellency the Acting Governor of the Leeward Islands, is extracted from the *West India Committee Circular*. Brief reference was made to this scheme in the *Agricultural News* (Vol. IV, p. 268):—

Mr. H. Hesketh Bell, the Administrator of Dominica, who, during the absence of Sir C. Courtenay Knollys, is now administering the Government of the Leeward Islands, has favoured us with a memorandum, which he has drawn up primarily for the consideration of the members of Lloyds, regarding the possibilities of insuring against the effects of hurricanes in the West Indies, with special reference to the conditions prevailing in Dominica and the other islands of the Lesser Antilles. The object of this memorandum is to show that (1) hurricanes do not occur in the West Indies as frequently as is generally believed; (2) reports of damages and disasters caused by them have often been much exaggerated; (3) insurance against losses could be effected with advantage to the landowner and with profit to the underwriters.

Under the first heading, Mr. Bell deals with the frequency of hurricanes, and the characteristics of those which occur in the West Indies, and gives a table showing the hurricanes which appear to have visited the British Islands in the Leeward group from 1800 to 1875. These are only seven in number, and it is pointed out that, 'though the formation of hurricanes in the Western Atlantic is an almost annual occurrence, the effects of these storms on islands in the Caribbean Sea are only to be feared when the track of a hurricane happens to pass directly over or very near to them.' Such an event is far more rare than it is usually believed to be.

Thanks to the kind assistance of the Hon. Francis Watts, C.M.G., Mr. Bell has been able to furnish a chart showing very clearly all the hurricanes that have passed through the eastern portion of the Caribbean Sea since 1878 to the present year, and this record is sufficiently long to give a reasonably correct idea of the risks to be feared from hurricanes. In the second part Mr. Bell points out that press reports and accounts of hurricanes, written just after they have taken place, are nearly always greatly exaggerated, and the first estimates of the damage done by such storms are very incorrect. The fragile construction of the huts and cottages of the lower classes renders them easily damaged, but these may be repaired without great loss. Much harm has been done to the West Indies by highly coloured reports of these catastrophes, and stress is laid on the point that while the damage and distress caused by a great hurricane, such as the Montserrat one in 1899, can hardly be exaggerated, every hurricane is not necessarily a great disaster. Under the third heading, Mr. Bell outlines a scheme of insurance, and gives certain details regarding the suggested assessment of damage, which we shall hope to publish in our next issue.

There can be no doubt that any scheme of insurance at reasonable rates of premiums would be enthusiastically welcomed, and that by thus materially reducing the probability of loss from hurricanes, agricultural enterprise in the West Indies would be relieved of its greatest handicap. If Mr. Bell succeeds in inducing members of Lloyds to accept this class of risk, he will have earned the gratitude of all planters and intending settlers in the West Indies.



GLEANINGS.

The Agricultural Instructor at St. Lucia reports that at Dennery Mr. Ward has some 150 colonies of bees, and his apiary is conducted on model lines. His queens are nearly all pure Italians.

A shipment of 28 dozen 'Pere Louis' mangos was recently sent from St. Lucia to Messrs. W. Pink & Sons, Plymouth. The fruits were packed in wood-wool in specially imported cases and arrived in good condition. The price obtained for the shipment was equivalent to 2½d. per fruit.

Mr. J. R. Bovell announces that he has for free distribution in Barbados some 250 plants of the Barbados supple jack (*Paullinia barbadensis*). A note on this attractive and interesting climbing shrub appeared in the *Agricultural News* (Vol. IV, p. 143).

During the fortnight ended August 24, 68 bales of West Indian cotton were imported into the United Kingdom. Medium fine is quoted in Liverpool at 6·35d. per lb.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; and extra fine, 15½d. per lb. (*West India Committee Circular*.)

The Agricultural Instructor at Nevis reports that the mungoose has so increased in numbers in that island as to be a menace to all feathered stock and is even reported to attack lambs and small goats. Monkeys are another pest to sugar and cacao planters; nothing is safe from their attacks near the mountain.

There is considerable demand in some of the West India Islands for seeds and plants of *Castilloa elastica*. Care should be taken to save all seeds for raising young plants for distribution. It would be of interest and economic importance if readers would report localities in which this tree is found to thrive.

Mr. E. L. Oliver, writing to Dr. Watts in reference to a small shipment of Nevis cotton, says: 'I think it well to draw your attention to a specially good lot as well as the faulty lots, to enable you to compliment the grower of these 3 bales, as I never expected Nevis could approach such a high standard of excellence.'

The Imperial Commissioner of Agriculture has received a packet of excellent picture post-cards showing views of the West Indian Court at the Colonial Exhibition as follows:—(1) The West Indian Court; (2) the Barbados Trophy; (3) a corner of the Barbados Court; (4) the Trinidad Court; (5) the Jamaica Court; (6) part of the Grenada Court. These cards are published by Geo. P. Osmond, 15, Seething Lane, London, E.C.

Samples have been received by the Imperial Commissioner of Agriculture of a new sweetmeat placed on the market by the firm of Pascal & Co., London, under the name of 'West India Molasses Candie.'

The *Textile Mercury* states that the hopes entertained that Cuba might become a large cotton-producing country have been entirely destroyed by the appearance of the boll weevil in almost every place where experimental crops have been raised.

The *Referee*, referring to Trinidad bananas, says:—'The new, red-skinned bananas from Trinidad are delicious. They have the delicate, jargonelle pear-drop flavour, and have only to become known to be highly appreciated by fruit lovers. But while they are 3d. each, they are too expensive for the prevailing epidemic of "no money."' (*Port-of-Spain Gazette*.)

It has been suggested that Barbados and Anguilla sea moss, to the utilization of which reference has already been made in the *Agricultural News* (Vol. IV, pp. 8 and 152), might serve the same purpose as the agar-agar made from Japanese sea-weed, which is largely used for culture media. Samples are being forwarded to the bacteriological laboratory at Cambridge to ascertain whether it would be suitable and what its value would be. These trials will be reported on in due course.

It is important that ripe cotton should not be allowed to remain on the plants after it has properly developed, for if it is allowed to remain, especially during showery weather, the seeds will germinate in the bolls, splitting open the seed-coat and sending out a primary root. When in such a condition it will be most difficult to gin; the young roots will be broken, and there will be a great danger of the seed-coats being torn off and passing with the broken roots through the gin and mixing with the lint.

The Curator of the Botanic Station at Dominica reports that there is a large demand for plants of the spineless lime. 'This lime produces very few seeds, usually only one or two in each fruit, hence there is a difficulty in raising a large stock of plants. A number of young trees are now coming into bearing at the station which will help to increase our seed supply.' It may be mentioned that 1,672 spineless lime plants were distributed from the station during the year 1904-5.

The Local Instructor at Montserrat reports: 'The bay trees planted at Harris' Station serve as an excellent object-lesson as to the possibility of these trees being planted on a large scale. These plants were got from the "bush" about two years ago. They were watered and only a few failed to grow. They are now flourishing young trees: some leaves were picked from them late last year. Planted in convenient places about 6 feet square, they can be controlled and kept as a bush by topping occasionally.'

A writer in the *Bulletin of the Department of Agriculture*, Jamaica, suggests the use of the guango or saman (*Pithecolobium Saman*) for shading cacao. Its wood is useful for furniture and makes nice flooring. Its beans are also valuable and for them there would be an opening for a trade with Canada. In banana cultivation it was found that good fruits could be grown under its shade, but as in wet situations the branches decay, the writer has had to cut out the trees from his banana walks.



ANTIGUA: ANNUAL REPORTS ON THE BOTANIC STATION AND AGRICULTURAL EDUCATION, 1904-5.

Botanic Station.—The expenditure for the year under review was £549 1s. 1d. The receipts amounted to £41 4s. 6d.

Owing to several changes in the staff during the year and the serious and prolonged drought, the work at the station has been carried on under difficulties. Useful work has, however, been done, notwithstanding these.

The nurseries for raising economic and other plants for distribution have been kept well stocked. Some 4,400 plants and quantities of seed were distributed; in addition, 10,000 seedling forest trees were raised and planted in the re-forestation plots.

The rainfall at the station during the year was only 32.94 inches; this figure is 20.03 inches below the average for the past five years.

In connexion with the work in the experiment plots, special interest attaches to the efforts to raise a new variety of cotton, hardy and disease-resisting, specially suited to local conditions. The Rivers' variety of Sea Island cotton was crossed with (a) local wild cotton, (b) Nevis wild cotton. The experiment is being proceeded with and will be watched with interest.

Economic experiments were continued at Scott's Hill and Skerrett's stations. They included an interesting experiment with the Rivers' Sea Island cotton seed to ascertain the reason for the lack of uniformity in the appearance of the imported seed. The results of this experiment have already been recorded in the *Agricultural News* (Vol. IV, p. 106). Interest attaches, also, to the experimental cultivation of broom corn.

This report is of considerable interest and contains useful information on a variety of subjects.

Agricultural Education.—The Agricultural and Science Master has prepared an excellent record of the work carried on by him in connexion with the Imperial Department of Agriculture.

Mr. Kirby's principal duties have consisted, as before, in giving lessons in chemistry, physics, and agriculture, at the Antigua Grammar School. In addition he has given instruction at the Girls' High School and at the Female Training College. A useful course of lectures on Tropical Hygiene for elementary school teachers was also given during the year.

DOMINICA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND EXPERIMENT PLOTS, 1904-5.

Botanic Station.—The expenditure on the Botanic Station for the year under review was £830 18s. 9d. This sum was, however, supplemented by a local vote of £125. The sale of plants and produce yielded £172 19s. 9d.

The number of plants distributed was 46,736; large quantities of cacao and rubber seeds were also supplied.

Mr. Jones reports that there was a continued increase in the demand for budded plants. This involves much more work on the station staff than the production of ordinary seedlings.

The report contains a summary, prepared by Dr. Watts, on the manurial experiments with cacao at the station, which should prove of considerable interest and importance to planters. The results, which are brought out very clearly in the diagram, go to show that 'proper care and manuring can be relied upon to give substantial increases in yield.'

With regard to other crops in the experiment plots attached to the station, it may be mentioned that the rubber trees are making good progress. Large numbers of plants and seeds of *Castilloa elastica* and *Funtumia elastica* were distributed during the year.

Interesting information is supplied in the report in reference to experimental shipments of rubber, gommier resin, fruits, and fish oils. Particulars of these shipments have already been given in the *Agricultural News*.

The report contains much that is of interest to Dominica planters in reference to economic experiments and other matters.

Agricultural School.—The expenditure on the school during the year was £550. The sum of £30 18s. 3d. was realized by the sale of vegetables, eggs, service of stallions, etc.

In the experiment plots attached to the school a large variety of crops was grown, special success being recorded in connexion with onion growing; the yield of onions was 4,000 lb. per acre.

A special feature of the practical instruction is the lessons in budding. Owing to the extensive planting of oranges in Dominica and the large demand for budded plants, this instruction should prove particularly valuable and is likely to result in a demand for the services of boys familiar with this process.

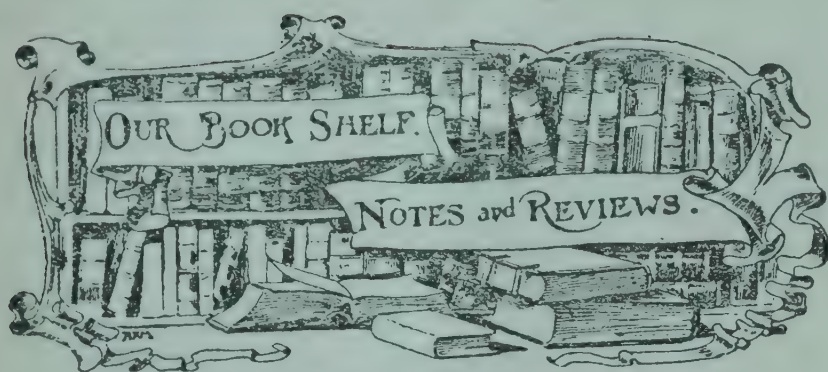
The list of boys who have left the school, with their present occupations, would appear to indicate that the Agricultural School is fulfilling a very useful purpose in Dominica.

Experiment Plots.—The report of the Agricultural Instructor deals with the working of seven cacao plots, two lime plots, one orange plot, and one rubber plot. The tables appended to the report show that increased yields have been obtained in the cacao plots in consequence of good cultivation and manuring.

In his journeys Mr. Branch has visited the cultivations of peasants, advising them as to their crops, the preparation of produce, etc. He has also given useful practical instruction in budding oranges and grafting mangos.

Mr. Branch is able to report that much more attention is now being devoted to pruning, manuring, and draining, on the part of the peasants; and the experiment plots appear to be serving a useful purpose in bringing to the notice of the peasants the requirements of their crops in regard to cultivation.

Coffees without Caffeine. The *Pharmaceutical Journal*, reviewing a paper in the *Comptes Rendus*, mentions that it was shown in 1901 that the coffee of the Comoro Islands (*Coffea Humblotiana*) contains no caffeine. Recently, three new species of *Coffea* have also been found on examination to contain no caffeine. These species are indigenous to Madagascar or its neighbouring islands. This non-occurrence of the alkaloid cannot be attributed to soil or climatic conditions, since other coffees grown there contain the normal amount of caffeine.



HINTS ON AGRICULTURE: By J. Edgar Beckett, Assistant Instructor in Agriculture, British Guiana. *Georgetown, Demerara: Estate of C. K. Jardin, Deceased, 1905.* Price, in paper covers, 24c.; in stiff boards, 36c.; in leatherette, 48c.

This little pocket volume of some 220 pages contains a large fund of practical advice to the small farmer in British Guiana.

As pointed out by Professor J. B. Harrison, in a preface, Mr. Beckett 'has had exceptional opportunities of noticing the salient points of the husbandry of the small farmers and settlers of British Guiana. He has made himself thoroughly conversant with the advantages and defects of the modes of cultivation practised by them, and his long connexion with the Agricultural and Botanical Departments of the colony has placed him in a position authoritatively to suggest modes adapted for remedying the latter.'

The hints are simple and straightforward and as such are likely to awaken a more intelligent interest in agricultural pursuits. The price of this publication is such as should place it within reach of the most humble members of the community, for whom, as well as to all farmers and planters, it will be found to contain much of interest and much of real practical value.

While dealing, more or less fully, with such crops as cacao, coffee, cotton, etc., which some village farmers may be unable to grow, there are also useful hints on the cultivation of common fruits and vegetables in which good business might be done.

The chapter on poultry farming should, as suggested by Professor Harrison, appeal to the wives and daughters of the farmers. This publication will be found admirably suited as a reading-book for the boys and girls of the elementary schools.

TROPICAL LIFE: A monthly journal devoted to the interests of those living, trading, holding property, or otherwise interested in tropical or sub-tropical countries. *London: John Bale, Sons & Danielsson, Ltd.* Subscription price, 10s. per annum.

This new journal, which made its first appearance with the July number, is devoted, as the sub-title indicates, to matters connected with agriculture and colonization in tropical countries. Its editor is Mr. H. Hamel Smith.

It is stated that a feature of the publication will be chatty leading articles on the markets, in place of the usual cut-and-dry reports.

The first issue has an interesting account of the 'Foundation in Paris of the International Tropical Agricultural Society. Interest also attaches to the article on the cultivation of fibres, which deals particularly with the necessity for a lighter make of fibre-cleaning machine.

The second issue contains an illustrated review, written by a shareholder, of the work of the British Cotton-growing Association. One of the illustrations shows the exhibit of West Indian cotton at the Imperial Institute.

GOMMIER RESIN.

Particulars were given in the *Agricultural News* (Vol. III, p. 155) as to the commercial valuation of gommier resin sent from Dominica to the Imperial Institute. It was stated that the samples were valued at 17s. to 18s. per cwt., as compared with 50s. to 55s. obtainable for true elemi from the Philippines.

As the samples were reported to be rather dirty, a second small consignment of 50 lb. was forwarded, the following report on its value being received:—

Samples of this consignment of gommier resin were submitted to brokers for commercial valuation. They reported that a considerable fall had recently taken place in the price of Manila elemi, which is at present worth only from 25s. to 30s. per cwt., as against 70s. to 80s. per cwt. at the corresponding period of 1903. It was thought that the sample of the West Indian resin, on account of its unsatisfactory appearance, would not at present be worth more than 10s. to 15s. per cwt.

It is stated in the annual report on the Botanic Station that these samples were collected with care but failed to satisfy the market requirements. The prices mentioned would scarcely pay the cost of collecting the resin in the forests of Dominica.

Particulars as to the collection of gommier resin are given by the Agricultural Instructor as follows:—

In the month of April I received instructions to collect a sample of resin in a soft state to be forwarded to the Imperial Institute to be reported on by the Director, in order to find out its commercial value. In the vicinity of the Trois Piton mountains and in the Bassinville district I tapped 172 trees. I found that in some cases the flow of sap was slow and the density seemed a little thicker than turpentine; in other cases it seemed to harden faster. The sap that did not harden quickly was washed away by heavy rains which were falling nearly every day at the time that I was collecting. The trees tapped by the side of the Imperial road were in a good many cases robbed of the resin by persons evidently collecting for making flambeaux (torches). The trees having mosses and wild pines growing up the stems gave the worst resin as regards impurities, as with even light showers the water running down the stems brought with it a lot of volcanic ash, which adhered in large quantities to the resin, which in such cases had to be abandoned. The trees giving the largest yield were those growing in pockets where the land seemed richer than the brows, the trees growing on the latter places giving the least resin. At Bassinville at the base of a mountain on which there had been an enormous landslip, I came across a tree with a very large deposit, the weight being fully 15 to 20 lb. of hard resin, which stood out like a post of sugar candy by the side of the tree and touching the ground. Trees giving such a large deposit are spoken of by the natives as 'trees with a sickness,' as they say the tree does not live for any length of time afterwards.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies, who, as previously announced in the *Agricultural News*, has been on an official visit to Jamaica, returned to Barbados in R.M.S. 'La Plata' on Thursday, September 21.

ST. VINCENT LAND SETTLEMENT SCHEME.

Improvement of the Allotments.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, has forwarded for publication the following account of the scheme for the improvement of allotments on the Land Settlement estates in that island by means of manurial experiments:—

The Land Settlement estates at St. Vincent, which were acquired by the Government under the Land Settlement Ordinance of 1899, are Richmond Hill, Clare Valley and Questelles, Park Hill, and New Adelphi, and groups of estates in each of the Linley and Cumberland Valleys.

The lands of each estate, except such as are reserved for the protection of the sources of streams, exposed ridges, townships, roads, etc., are divided into allotments of areas varying from 1 acre to 7 acres.

At the end of last year the Agricultural Instructor was directed to draw up a full report on the allotments, in order that the progress made might be noted. In the report which he prepared it was shown that there were 689 allotments, and the approximate area in cultivation was 2,650 acres. This area is cultivated by the allottees according to instructions of the officers of the Imperial Department of Agriculture under the authority of Rule 19 (b) of the regulations made under the provisions of the above-named Ordinance. The rule reads as follows:—

‘Every purchaser of an allotment shall for a period of sixteen years, reckoning from the date of allotment, carry out such instructions as to the clearing of the land, the area in cultivation, the nature of the products to be planted in a particular spot, the manner in which the land is to be cultivated, and the products cared for, and the handling of the produce for market, as may from time to time be given to him by the officers of the Imperial Department of Agriculture for the West Indies.’

In May 1904, his Excellency the Governor directed that, in order to prevent the exhaustion of the lands of the allotments, the preparation and keeping up of compost-pits on each allotment should be insisted on under this rule, and further stated that he would be prepared to approve of purchasing artificial manure and giving it in small quantities, as an experiment, to those persons who had kept compost-pits. In this way it was thought that general industry would be encouraged, and the people would see the advantages of manuring their lands.

When these instructions were received the Agricultural Instructor was directed to proceed with the work, and commenced instructing allottees during the following month.

On November 23, the Agricultural Instructor reported that he had visited all of the estates and instructed allottees to prepare compost-pits, had shown them how they were formed, and explained the object.

He reported again on June 28 of this year that of the 689 allotments 540 were occupied, and that 400 allottees had carried out instructions. Those allottees who had not carried out his orders were warned by the Government that their allotments would be liable to forfeiture if they did not carry out what they were told to do, and, as an example, some of the worst cases were summarily dealt with. Since this action was taken a good many more of the allottees have started making up compost and manuring their lands.

When the last report was forwarded, the Government directed me to make out a description with the cost of artificial manures requisite to issue to the 400 allottees who had

carried out instructions. This presented some difficulty owing to the varied character of the crops grown, but eventually a scheme was drawn up which it was thought could be worked so that each allottee would receive a quantity of artificial manure suitable for a small area of the crop grown, which area would be of sufficient size to see the result of the manure.

The scheme may be briefly stated as follows:—Each of the 400 allottees to receive, free of cost, a supply of artificial manure to apply to $\frac{1}{4}$ acre of land in either of these three groups of crops, namely, canes, cacao (bearing), and provisions. (Under provisions is included cassava, sweet potatoes, yams, tannias, and arrowroot.)

For each of the three groups the following manures are to be given:—

For canes, sulphate of ammonia at the rate of 2 cwt. per acre.

For cacao (bearing), basic slag and sulphate of ammonia at the rate of 4 cwt. and 1 cwt. per acre, respectively.

For provisions, kainit and superphosphate at the rate of 2 cwt. and 1 cwt. per acre, respectively.

It is estimated that 220 allottees will receive manure for canes and cacao, and 180 for provisions.

The cost of the manure was estimated at £100.

This scheme was submitted to the Imperial Commissioner of Agriculture, who wrote that the proposals were quite workable, provided that the manures were applied at the right time and in the right way. ‘The better arrangement would be for the manures to be applied to the land before the crops are planted, or, failing this, as soon as possible after they are planted. Fortunately, the manures selected are not those that would be easily washed out of the soil by heavy rains.’

The scheme has been approved by the Government, and the expenditure of £125 from Land Settlement funds sanctioned to be expended on manures on the lines proposed.

During the present month it is proposed to distribute manures for canes and cacao, as this can be done with advantage at this season. The manures for the provision crops will be obtained and distributed just before the chief planting season, which will be about March next.

It should be mentioned that allottees will be encouraged to apply compost or other manure to their lands, and that these manures will be, as it were, as an additional dressing.

The officers of the Department will follow up this experiment closely, and some useful information should be obtained.

Once the advantage of applying manure to their lands is clearly demonstrated to allottees, the successful working of the estates should be assured, as very considerable progress has been made during the last two or three years.

Pond Flies are very common at this season of the year in fields of growing crops, especially in the fields of older cotton. These insects pass the early stages of the life-cycle in stagnant water, where they are predaceous on aquatic insects and other small animals. The adults are known to be insect eaters, but there seem to be no observations on record of their feeding habits in the cotton and other fields in the West Indies. It would be very useful if the readers of the *Agricultural News* would report any instance of a pond fly actually seen feeding on any insect. Pond flies probably devour small insects while on the wing, but larger ones such as moths and butterflies are borne to the ground and there eaten.

MARKET REPORTS.

London,—August 31, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 25, 1905; and 'THE PUBLIC LEDGER,' August 26, 1905.

ALOES—Barbados, 15/- to 45/-; Curaçoa, 15/- to 50/- per cwt.
 ARROWROOT—St. Vincent, 1½d. to 2½d. per lb.
 BALATA—Sheet, 1/10 to 1/11; block, 1/5½ to 1/6 per lb.
 BEES'-WAX—£7 15s. to £8 2s. 6d. per cwt.
 CACAO—Trinidad, 54/- to 62/- per cwt.; Grenada, 47/- to 52/- per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 40/- to 41/- per cwt.
 COTTON—West Indian, medium fine, 6'35d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—Jamaica, 4/- to 6/- per bunch.
 ORANGES—Jamaica, 14/- to 20/- per box.
 PINE-APPLES—Jamaica, 9d. to 1/- per pine; Antigua, 16/- per barrel.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—No quotations.
 HONEY—16/- to 23/6 per cwt.
 ISINGLASS—West Indian lump, 2/2 to 2/7; cake, 1/ to 1/3 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 9d. to 1/1 per gallon; concentrated, £18 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/7 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—No quotations.
 NITRATE OF SODA—Agricultural, £11 per ton.
 NUTMEGS—60's, 1s. 7d.; 70's, 1s. 2d.; 80's 11d.; 100's, 7½d.; 120's, 6d.; 142's, 5¼d.; 164's, 4¾d., and in shell at 4½d.
 PIMENTO—2½d. to 2½d. per lb.
 RUM—Demerara, 1/1 per proof gallon; Jamaica, 2/1 per proof gallon.
 SUGAR—Yellow crystals, 17/- per cwt.; Muscovado, 14/3 to 14/7½ per cwt.; Molasses, 11/6 to 14/6 per cwt.
 SULPHATE OF AMMONIA—£12 8s. 9d. per ton.

Montreal,—August 10, 1905.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

BANANAS—No quotations.
 COCOA-NUTS—Jamaica, \$22.00 to \$24.00; Trinidad, \$19.00 to \$21.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 LIMES—Jamaica, \$6.00 per barrel.
 MOLASCUIT—Demerara, \$1.32 per 100 lb.
 MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 20c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5c. to 5¼c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Grey crystals, 96°, \$2.60 to \$2.85 per 100 lb.
 —Muscovados, 89°, \$2.10 to \$2.35 per 100 lb.
 —Molasses, 89°, \$1.85 to \$2.10 per 100 lb.
 —Barbados, 89°, \$1.95 to \$2.10 per 100 lb.

New York,—August 18, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11¾c. to 12c.; Grenada, 11¼c. to 11½c.; Trinidad, 11¾c. to 12c. per lb.; Jamaica—No quotations.
 COCOA-NUTS—Jamaica, \$28.00; Trinidad \$24.00 to \$26.00 per M.
 COFFEE—Jamaicas, 8½c. to 11c. per lb. (ex store).
 GINGER—Jamaica, 7c. to 8½c. per lb.
 GOAT SKINS—Jamaicas, 57c. per lb.

GRAPE FRUIT—No quotations.

MACE—29c. to 32c. per lb.

NUTMEGS—West Indian, 80's, 22½c.; 110's, 14½c.; 130's, 11c. per lb.

ORANGES—No quotations.

PIMENTO—4¾c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3½c. Molasses, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—September 11, 1905.—Messrs. T. S. GARRA WAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.50 per 100 lb.
 CACAO—\$11.00 to \$11.05 per 100 lb.
 COCOA-NUTS—\$10.00 per M. for husked nuts; \$8.50 for nuts in husks.
 COFFEE—\$10.00 to \$11.00 per 100 lb.
 HAY—95c. to \$1.10 per 100 lb.
 MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolve guano, \$55.00; Special cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 ONIONS—Madeira, \$2.24 to \$3.25 per 100 lb.
 POTATOS, ENGLISH—Berinuda, \$3.66 per 160 lb. (retail).
 RICE—Ballam, \$4.20 to \$4.75 per bag (190 lb.); Patna \$2.86 to \$2.96; Seeta, \$3.26; Rangoon, \$2.50 per 100 lb.
 SUGAR—Yellow crystals, \$4.25; Muscovados, 89°, \$1.80 per 100 lb.

British Guiana,—September 4, 1905.—Messrs. WIETIN & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
 CACAO—Native, 14c. per lb.
 CASSAVA STARCH—\$5.00 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Rio and Jamaica, 13¼c. to 13¾c. per lb. (retail). —Creole, 14c. per lb.
 DHAL—\$3.75 to \$3.90 per bag of 168 lb.
 EDDOES—56c. per barrel.
 MOLASSES—No quotations.
 ONIONS—Madeira, \$2.70 per box of 100 lb., ex ship Tenerife, 1¾c. to 2c. per lb. (retail).
 PEA NUTS—American, 5½c. per lb. (retail).
 PLANTAINS—12c. to 28c. per bunch.
 POTATOS, ENGLISH—2½c. to 2¾c. per lb.; Tenerife, 2¾c. per lb. (retail).
 POTATOS, SWEET—Barbados, \$1.44 per bag.
 RICE—Ballam, \$4.15 to \$4.20 per 177 lb.; Creole, \$3.90 to \$4.00 per bag.
 TANNIAS—\$1.44 per barrel.
 YAMS—White, \$2.28 per bag; Buck \$2.64.
 SUGAR—Dark crystals, \$2.35 to \$2.40; Yellow, \$3.40 White, \$4.50; Molasses, \$2.40 to \$2.50 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—September 5, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.50; estates \$11.40 to \$11.75 per fanega (110 lb.); Venezuelan \$11.25 to \$11.60 per fanega.
 COCOA-NUTS—\$20.00 per M., f.o.b.
 COCOA-NUT OIL—67c. per Imperial gallon (casks included).
 COFFEE—Venezuelan, 10c. per lb.
 COPRA—\$2.80 to \$2.90 per 100 lb.
 ONIONS—Stringed, \$2.00 to \$2.30 per 100 lb. (retail).
 POTATOS, ENGLISH—\$2.15 to \$2.50 per 100 lb.
 RICE—Yellow, \$4.25 to \$4.50; White, \$4.50 to \$5.60 per bag.
 SUGAR—White crystals, \$4.00 to \$4.50; Yellow crystals \$3.00; Molasses sugars, \$2.50 to \$3.00 per 100 lb.



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Agricultural Prospects at Jamaica.

IN connexion with the recent official visit of the Imperial Commissioner of Agriculture to Jamaica, it may be of interest to review briefly the agricultural prospects of the colony.

A striking feature of the present situation is the increased interest which is being taken in developing the undoubted resources of the island, especially in regard to sugar cultivation. The Imperial Commissioner is of opinion that sugar and rum must continue to be two of the leading industries, as without them it would be impossible to maintain the prospects of the island in a thoroughly satisfactory condition. Now that the bounties have been abolished and the prospects for West Indian sugar in Canada are likely to be improved, the industry should be largely developed. There is no doubt that in the Vere district, provided water is supplied in sufficient quantities, the outlook for sugar cultivation is so favourable that the industry could be carried on so as to compete with any part of the world. The establishment of two new central factories in this district is likely to meet with satisfactory results.

In the production of first-class rum Jamaica stands in the foremost position, and it should be the aim of all concerned to maintain this position in spite of any changes that may take place in regard to the production of sugar by means of central factories. The work that is being carried on under the direction of Dr. Cousins at the Government Laboratory and at the Sugar Experiment Stations in different parts of the island deserves the warm support of the planting community, as it is confidently believed that it will eventually be productive of much good.

In regard to the banana industry, while it is of great value to the colony, it would be a misfortune if, in the case of, comparatively speaking, so risky a cultivation, too much reliance were placed upon it.

The original idea was that the bananas were to be largely used as shade and nurse plants for cacao and other crops of a permanent character. It would be of great advantage if cacao cultivation could receive still further attention. The existing plantations should be more carefully cultivated and the bananas upon them gradually removed so as to leave the land well established in cacao. Planters are also urged to consider the desirability of planting *Castilloa* rubber trees among their cacao, as has already been successfully done in Tobago. In the latter island there are 90,000 rubber trees already established on cacao and other estates.

Of the principal industries suited to Jamaica, bananas, cacao, and rubber could be worked together; sugar, rum, logwood, cotton, and cocoa-nuts would form another group; while tobacco, cassava, and pimento might be placed in a third group, with pen keeping as a separate industry in such parishes as St. Ann's, St. James', and Hanover. In Jamaica the conditions are more favourable for diversified industries than probably in any other part of the West Indies. What is necessary is for them to be carried on on thoroughly systematic and practical lines so that every advantage be taken of local conditions.

Excellent work is being done by the Agricultural Instructors maintained by the Board of Agriculture and the Agricultural Society. Their efficient services afford the hope that the mass of the people will steadily reach a higher standard of effort in agricultural matters.

Amongst other subjects that deserve to be taken up on thoroughly enterprising lines is the cultivation of tobacco. Jamaica cigars and cigarettes have now become so widely known that tobacco growing should be regarded as one of the most promising industries and one that would well repay the judicious outlay of capital in suitable localities. Jamaica cigars are obtainable and are regularly in use at all the best hotels and clubs in the West Indies. The only difficulty is that they are not produced in sufficiently large quantities to establish a large trade also with the mother country.

It is a matter for regret that orange cultivation on systematic lines has not been so successful as could be wished. A mistake has been made in attempting to establish orange groves in the lowlands and in unsuitable situations. The best oranges undoubtedly grow at elevations of about 1,500 feet to 2,000 feet. Orange growing, in spite of past failures, may still be retrieved if the conditions necessary to success are thoroughly studied. The cultivation of pine-apples has also been

of a disappointing character, chiefly owing to the selection of unsuitable soils.

So far, cotton planting has not made the progress in Jamaica that was hoped for. There are, however, some very promising cotton fields in the Vere district, and it is likely that, when the requirements of the plant are more fully understood, the area under cultivation will steadily increase. Some excellent cotton has been grown in Jamaica, and there is no reason why the industry should not become thoroughly established. The Commissioner was credibly informed that in Vere there are probably 2,000 acres of land, at present unoccupied, that would grow excellent cotton.

The advantages possessed by Jamaica in the raising of cattle and horse-kind are of a striking character. Jamaica horses are greatly appreciated everywhere, and finer cattle could not be found anywhere in the tropics. Good carriage horses are in demand in British Guiana, Trinidad, and Barbados. The difficulty is to obtain a sufficient number of animals exactly suited to the requirements of these colonies.

There is abundant evidence of increased interest in agricultural matters in Jamaica, and Sir Daniel is satisfied that distinct progress has been made of recent years. It is desirable, however, that still greater efforts be made to educate and train the rising generation in sympathy with a careful and thorough cultivation of the soil, and that large tracts of fertile land, within easy reach of roads and railways, now lying waste, be taken up and established in crops suited to the soil and climate, and capable of yielding remunerative returns.

SUGAR INDUSTRY.

Naudet Process at Madeira.

The following information in regard to the sugar industry at Madeira is extracted from the *Consular Report* for 1904. It deals particularly with the Naudet diffusion process, which was first tested at Madeira:—

The sugar-cane crop for 1904 was approximately the same as that of the previous year, and there have been no complaints of disease in the cane, the season having in this respect been a very good one. The most remarkable feature of the crop has been the largely increased quantity of Yuba cane now grown in the island. This would seem to point to the fact that the grower obtains a larger quantity of cane per acre with the Yuba than with other kinds, which it will probably supersede altogether in course of time. From the refiner's point of view this is of no particular advantage, as the cane gives little, if any, additional purity of juice, and is,

moreover, more difficult to crush, owing to the extreme toughness of the rind.

The Hinton-Naudet process, to which reference has been made in previous reports from this consulate, * has now been adopted at Porto Rico and Trinidad in two large factories with a capacity of 1,200 and 600 tons per day, respectively, with results most satisfactory to the sugar planters who speak enthusiastically of it. There seems little doubt that, sooner or later, all planters will be compelled to install the new system, which not only reduces the cost of sugar manufacture and facilitates the whole process, but—a point of even greater importance—extracts the whole of the juice, except about 0·36 † per cent., instead of allowing a large proportion of the sugar to go to waste, as has hitherto been the case. In these days of keen competition such advantages are of the utmost importance.

A description of the process will be found in the report from this consulate for the years 1901 and 1902 (No. 3,057, Annual Series), to which I would refer those desiring full details, but it may be useful to append a technically worded summary of its advantages, which has been furnished me by Messrs. W. Hinton and Sons, of Funchal, who were the first to apply the system (already in vogue on the Continent for beet sugar) to the extraction of the juice of the sugar-cane. These advantages, briefly summarized, are:—

1. Single crushing.
2. Defecation of the juice and its filtration, after defecation, in its own megass (or cane waste) in diffusors.
3. Recovery of all sugar in juice and megass, with a loss of from 0·36 to 0·4 per cent. †
4. The megass, after being passed through a mill to extract the waste, is used as fuel in the ordinary way.
5. Total abolition of all skimmings, filter presses, and of the acidity resulting from their use.
6. A defecated juice unaffected in purity and perfectly brilliant.
7. A much higher yield in sugar, entailing less expense and less fuel, as the defecation of the juice is made in special heaters with the use of exhaust steam.

Cane Farming at Trinidad.

The following information is abstracted from returns relating to the Trinidad Cane Farmers' Crop of 1905 (with figures for the seven previous years), laid before the Agricultural Society on September 12, 1905, and published as Society Paper No. 235:—

Year.	Total sugar made. Tons.	Tons of sugar made from estate canes not weighed.	Tons of estate canes ground.	Tons of canes purchased.	Amount paid for canes.	No. of Farmers.
1905	38,240	—	244,418	144,868	\$482,053	10,866
1904	50,744	1,669	385,015	171,947	360,046	9,331
1903	—	1,783	337,632	166,590	348,445	8,883
1902	—	4,379	337,911	184,867	327,183	9,356
1901	—	3,652	434,003	169,918	369,482	8,556
1900	—	1,286	364,355	105,996	227,865	6,417
1899	—	1,571	426,306	106,741	219,011	6,696
1898	—	—	—	105,753	202,901	6,150

* See *Agricultural News*, Vol. III, p. 354.

† Not 36 per cent., as has been erroneously stated.

WIRELESS TELEGRAPHY.

In reference to the extracts from a report on wireless telegraphy by Sir W. H. Preece, K.C.B., which were published in the *Agricultural News* (Vol. IV, p. 251), it may be of interest to publish the following review of a paper on the 'Absorption of electromagnetic waves by living vegetable organisms,' which appeared in the *Experiment Station Record* for June 1905:—

In connexion with a report on investigations of wireless telegraphy carried on for the War Department, the author gives an account of some phenomena suggested by the action of trees as conductors for electromagnetic oscillations. The experiments were carried on principally in the vicinity of San Francisco, a grove of Eucalyptus trees being utilized as the receiving station.

The apparatus and method of experiment are described, and it is said that the trees were found to serve as a substitute for the towers and masts usually required to carry the antennae wires. The investigations showed that the trees were capable of receiving and giving off the electric current required in wireless telegraphy, and marked differences in efficiency were noted with different species of trees, such as willow, pine, spruce, oak, etc. A tree with a small leaf surface and in an unhealthy condition was found to be poorly suited for the purpose of the experiment, and dead trees practically behaved as insulators.

After a little practice it was found that two men could install a sending station in from 10 to 15 minutes, or a receiving station in even less time. All that was necessary was to fasten the apparatus to the side of the tree and attach the wires, one above and one below, nailing them into the tree.

In the course of the experiments an attempt was made to measure the electrical resistance of plant cells between the metallic electrodes inserted in the trunk of a tree, and several curves were taken, but sufficient regularity was not observed to enable any generalization regarding the phenomena. In summing up his investigations, the author believes that living plants may serve a more important part in electrical phenomena than has been generally supposed, and he urges a more general study of the physical phenomena as related to plants.

FISHING IN JAMAICA.

The recently issued hand-book *Jamaica in 1905* has the following note on the fishing to be obtained in that island:—

The rivers of Jamaica offer great attractions to the fisherman. At the mouths of nearly all the rivers, snook, June-fish, snapper, and the famous tarpon are to be caught with rod and reel or hand-line; the last named (viz., tarpon) being a rival to the celebrated salmon on a rod, and some great fishermen declare that he is superior. The tarpon also abounds in the bays and inlets, and they often scale over 100 lb. Tarpons have been caught with rod and line at Jamaica up to 56 lb. in weight; with a net up to 153 lb. It is seldom that callipever and snook, or mullet are taken with a cast net. When it is, it is only by a fluke. Higher up in the rapids are found the far-famed mountain mullet, also hog-nose mullet, sand fish or mud-fish, snook, tarpon, and drummer, all to be caught with rod and reel. The mountain mullet is an excellent substitute for brook trout, and the hog-nose mullet, and callipever are like lake trout and just as game; they nearly always scale between 3 lb. and 8 lb.



WEST INDIAN FRUIT.

SPINELESS LIMES.

Reference was made in the last issue of the *Agricultural News* (p. 300) to the distribution of spineless lime plants from the Botanic Station at Dominica. These plants are propagated from seed. It was considered that it would be of interest to obtain information as to the behaviour of this variety under the influence of seminal propagation; the particular point of interest was whether the plants 'come true' when grown from seed. Mr. Jones relates his experience as follows:—

The oldest spineless lime plants at this station are fourteen years old. These show no signs whatever of developing spines.

Of the seeds of spineless lime sown probably about 80 per cent. 'come true.' The remainder are thorny and are rejected.

Sometimes I have noticed in the seed beds plants that are intermediate; that is, they have short, blunt thorns. These, on being planted in the field, became spineless when about 4 feet in height, so the tendency appears to be towards throwing off the spines rather than developing them.

JAMAICA ORANGE INDUSTRY.

With a view to showing that the statement frequently made in Jamaica that orange dealers are ruining the trade by shipping all the bad fruit that comes to them does not apply to all dealers, the Hon. J. P. Clark has forwarded to the *Daily Telegraph* the following particulars of one week's work in two of his packing houses:—

The particulars will show that at all events some of us endeavour to protect the trade. If the suggestion that I made at a public meeting two years ago could be carried out, and no fruit be permitted to be packed except in a licensed house, such things could not occur, as growers would be forced to take their fruit to a decent house to be packed after it has shrunk and been sorted, instead of being packed immediately after having been picked, regardless of bruises, etc.

	Received.	Packed.	Thrown away.
Williamsfield ...	1,004	510	494
Kendal ...	882	698	184
	1,886	1,208	678

BANANAS FROM MARTINIQUE.

The following is extracted from the *Fruit Grower*:—

In the case of bananas the cry is 'still they come.' The impetus which has of late been given to this culture is becoming infectious and every island where bananas can be grown is entering the list. Martinique is the latest addition and is, moreover, not to be left out of account. There are regular lines of steamships, including the Compagne Generale Transatlantique, which call at Martinique, and it is anticipated that these vessels will be equipped for the carriage of fruit and that the industry of banana culture may prove a paying one here as elsewhere.

SHOW OF COLONIAL FRUIT.

The next show of colonial fruit will be held by the Royal Horticultural Society on Tuesday and Wednesday, December 5 and 6, 1905, at Vincent Square, Westminster, London, S.W. It may be mentioned that the prize list shows that provision has been made for, amongst others, the following classes in which fruit growers in the West Indies are more particularly interested:—

DIVISION I.—COLONIAL-GROWN FRUIT AND VEGETABLES.

Class 5.—Pine-apples.

„ 6.—Bananas.

„ 7.—Mangos.

„ 8.—Grapes.

„ 9.—Oranges.

„ 10.—Limes and lemons.

„ 11.—Shaddocks, pomelos, and other like fruit.

„ 17.—Yams, sweet potatoes, and other tubers.

„ 18.—Vegetables other than tubers.

„ 19.—Any other colonial-grown fruits or vegetables.

DIVISION II.—PRESERVED FRUITS, JAMS, ETC.

This division includes exhibits of colonial-grown and colonial-prepared fruits—bottled, tinned, or dried; colonial-grown and colonial-preserved vegetables, and colonial-grown fruits made into jam, jelly, syrup, etc., in the colony.

Dried or preserved fruits of any sort or kind may be shown, subject to the condition of their being tasted by the judges, and of their having been grown in a British colony.

No entrance fee or charge for space is made and tabling is also provided free of expense. If desired any produce may be consigned direct to the society, but the society cannot undertake to repack and return any exhibits.



CULTIVATION OF TEA IN JAMAICA.

The following account of the cultivation of tea in Jamaica is extracted from *Jamaica in 1905* :—

There are at the present time only two tea plantations in the western hemisphere; one at Summerville, South Carolina, U.S.A., and the other at Ramble in St. Ann, Jamaica.

Varieties of the tea plant were introduced into Jamaica in 1868, and were planted in the public gardens on the Blue Mountains, some 4,900 feet above sea-level, where they grew well. Some twenty years later a plantation of about 13 acres was formed in the neighbourhood of the gardens at Cinchona, but the cultivation was discontinued, and although the bushes are still growing well, it has not yet been resumed. In 1896 the plantation at Ramble in St. Ann was commenced. Its progress at first was very slow, every step having to be tested by experiment. The soil being different to that of Cinchona, the rainfall less than at that place, and the elevation only 1,600 feet above sea-level, it was necessary to commence by trying whether the plant would grow under the altered conditions sufficiently well to make it worth while to incur the great initial expense of forming a plantation. This test was made with 250 plants and a packet of seed from the Cinchona gardens. The result being favourable, the cultivation was extended as plants or seed could be procured; but the quantity not being large for several years, only a small acreage could be planted. Of course, seed could have been imported, but it was decided not to do so for two reasons; firstly, that the tea grown might be homogeneous in character, and secondly, for fear of importing certain enemies of the plant with the seed. Latterly the cultivation has expanded more rapidly, seed being obtained from the plants first put in; there are now from 80 to 90 acres with plants of various ages.

After demonstrating that the plant would grow in St. Ann, it was necessary to experiment in manufacturing the tea from the leaf to judge whether its quality would justify a heavy expenditure on machinery for curing it. This test having been passed, machinery was procured and tea prepared for market, the first occasion being at the Thickets Show, in August 1903. Since that time additional and improved machinery has been set up, and with the experience gained by practice in the manufacture, a good class of tea is being turned out.

Tea is essentially a factory crop; it requires a large initial outlay for buildings and machinery; and there must be considerable expenditure for keeping the ground clean while the plants are growing, about five years. In Jamaica this item constitutes a serious handicap on the planter, as compared with India, where the rate of wages is very much lower. For these reasons, tea cultivation requires a much longer period of waiting, before it can be remunerative, than some other cultivations, such as the banana; but on the other hand, it is not subject to any great risk from hurricanes, and it is a crop with many advantages for the settler who lives within reach of a factory. He can grow the plant in his provision ground without stopping his other cultivation, and when the plants are large enough he will have at the factory at all times a market for his leaf.

In this connexion it may be of interest to publish the following extract from the account of an interview

given to a representative of the *Jamaica Gleaner* by the Imperial Commissioner of Agriculture :—

Amongst the newer industries, I am glad to find that the Hon. H. E. Cox has extended his tea cultivation at Ramble, St. Ann, to 90 acres. This area is beautifully kept and the trees are in excellent health. The quality of the tea has greatly improved since my last visit to Jamaica, and when the new machinery which Mr. Cox has imported is in full working order, the tea of the coming season should all be of first-class quality. The tea is entirely made by machinery, and does not come in contact with the hands of the working people during the process of manufacture. This is the only tea cultivation in the West Indies and the prospects for the industry are very favourable.

FUNGOID DISEASES OF THE GRAPE.

While grape growing is not an industry which has assumed any great importance in the West Indies, grape vines are found in gardens in most of these islands, and specimens of diseased vines are not infrequently sent to the Imperial Department of Agriculture for examination. A few notes on the methods of treating the vines so as to avoid loss from fungoid diseases may therefore be of interest.

Every year enormous losses occur in the vineyards of Europe and America through the improper treatment of the vines. In the United States this subject has been thoroughly investigated by highly qualified scientific men, located in every part of the country. The diseases which now interest people in these islands are those caused by fungi, which attack the foliage, fruit, and stem. What is known as 'Mildew' is a common disease in the West Indies. Another is 'Rust,' injuring the leaves and turning them a reddish brown colour. The latter is to be met with everywhere and is probably the most difficult to get rid of.

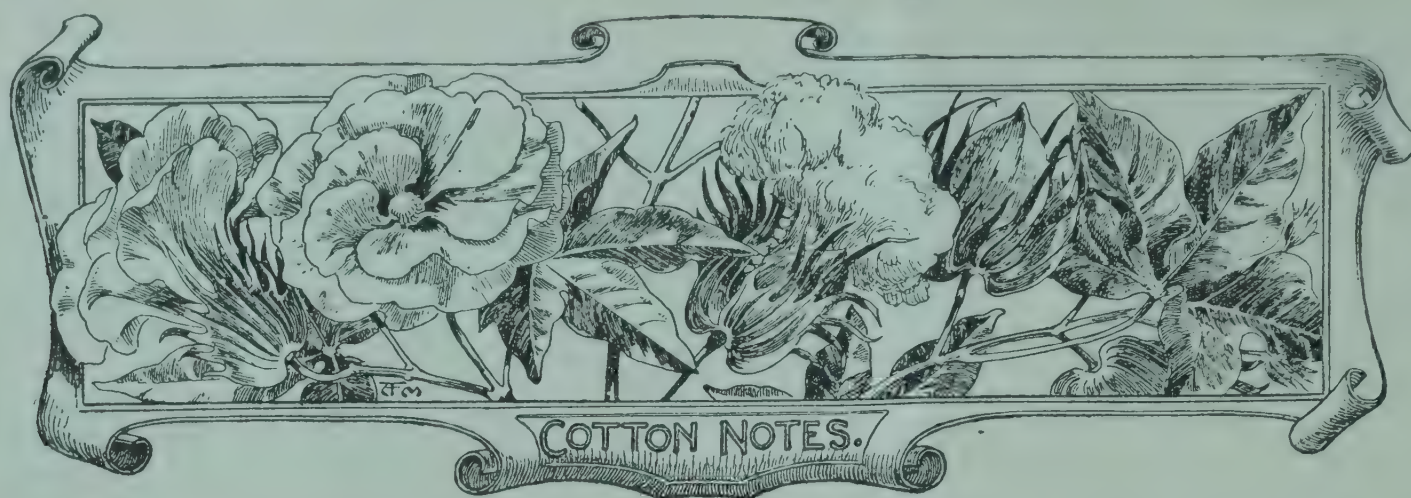
These and other fungoid diseases have been fully worked out and measures are known for their prevention. The latter have been deduced from the biology of the parasite and its relation to its host. A fungus generally spreads by means of spores which are scattered by the wind, by insects, birds, etc., and even through human agency. Probably, however, the commonest source of plant infection arises through carelessness in not promptly destroying diseased leaves, fruits, etc., which, in most instances, can readily be done without much expense. Of course the cultivator cannot directly prevent the diffusion of spores by wind, etc., but the following suggestions may be of use to those who wish to produce healthy and good fruit :—

(1) Burn all diseased leaves and fruit, and do not throw them on the manure heap, which means securing a recurrence of the disease.

(2) Wounds made by pruning should be immediately protected by a coat of tar or some other substance capable of preventing the germination of spores on the cut surface.

(3) The vines should be sprayed with Bordeaux mixture when just coming into leaf, when in flower, and again when fruits are just ready for thinning. Directions for preparing this fungicide will be found in Pamphlet No. 17, 'General Treatment of Fungoid Pests,' and in the *Agricultural News*, Vol. III, p. 214.

(4) Any appearance of disease, when the fruit is ripening, should be kept in check by other sprayings with weaker solutions. The most important of the sprayings is the one when the vines are just out in flower. Careful attention to this and the other suggestions given above should keep the plants free from fungoid disease and ensure a healthy crop of grapes.



SEA ISLAND CROP REPORTS.

The following information in regard to the Sea Island crop is extracted from recent reports of Messrs. Henry W. Frost & Co., Charleston, South Carolina:—

From the Islands and coast of Carolina some localities give very unfavourable reports as to the promise of the crop, others not as much so, and others even favourable. But taking the island crop as a whole, from the present outlook it is estimated it may fall short of the last by 10 to 15 per cent.

The reports from Georgia and Florida are also generally unfavourable. They are, however, to about the same purport as in Carolina, as some sections report a fairly good promise.

The weather has now become settled and favourable, and should we continue to have favourable conditions from now on, there will be ample time for the prospects to improve. The general opinion now is that the crop can, under no circumstances, equal the last; but it is impossible at this date to predict what the final result will be.

SEA ISLAND COTTON IN THE WEST INDIES.

The 'Annual Sea Island Cotton Report' of Messrs. W. W. Gordon & Co., of Savannah, Georgia, has the following reference to the important position that the West Indian cotton industry is assuming:—

The cultivation of Sea Island cotton in the West India Islands is assuming important dimensions, and the planters there are making every effort to produce desirable grades of Sea Island cotton by selecting the seed with care, by using the best qualities of fertilizers, and by rotating their crops. Cotton raised during the past season proved satisfactory as a substitute for the higher grades of Florida and Georgia cotton, and the average grades of Sea Island cotton.

If planters of Florida and Georgia cotton desire to continue to obtain good prices for their product, it will be absolutely necessary for them to exercise more care in separating the seed-cotton which has good staple from the seed-cotton which has poor staple before the cotton is put through the gin. We also urge upon our customers the importance of carefully selecting and putting aside the seed produced upon the most vigorous and perfect stalks, so that they may have this seed for planting purposes next season, in case it proves to be impossible to obtain fresh seed from the Carolina Islands. We strongly emphasize the necessity of keeping up the quality of the staple of the cotton and of packing bales which are perfectly uniform, both in staple and preparation. Interior merchants should take steps to impress these requirements upon the planters of Sea Island cotton. A failure to do so will result in lower prices.

WIND-BREAKS IN COTTON FIELDS.

Whenever young cotton is sheltered by a field of canes or corn, or by an elevation in the land, the growth of the young cotton plants is much more luxuriant than when they are fully exposed to the breeze.

When there is but a low rainfall and a constant breeze is blowing over a field of young cotton, the drying influence of the wind is very distinctly reflected in the young plants, for they do not possess the healthy vigorous appearance which is seen in the plants sheltered in the manner above described, but remain small and starved.

If the cotton field is a large one with a field of canes on the windward side, it is very easy to see the extent of the protection afforded by the canes. Where protected, though in the same field, the plants will be twice or three times as large as those beyond the protection of the canes.

Good head-rows of Guinea corn might be planted on the windward side of the field, or, if the field is large, one or more rows might be run across it.

COTTON GROWING IN BARBUDA.

Dr. Francis Watts has furnished the following information in respect to the experimental cultivation of cotton in the island of Barbuda. A sum of £100 was placed at the disposal of the Government for the purpose by the British Cotton-growing Association:—

I have to inform you that 19 bales of first-class cotton and 3 bales of stained cotton have been shipped in connexion with the Government experiment in cotton growing in Barbuda. It may be interesting to make the following provisional estimate of the position, in view of the steps to be taken to continue the cultivation:—

Cost of cultivation, etc., ...	£101	0	0	
„ „ ginning and baling ...	25	0	3	£126 0 3
11 bales sold at 1s. 1½d. per lb.	£103	0	4	
8 bales to be sold, say, at £9 per bale... ..	72	0	0	
3 bales stained cotton, say, at £4 10s.	13	10	0	188 10 4
Profit on cotton alone ...				£ 62 10 1

In addition, there were produced 9,909 lb. of cotton seed, which has been returned to Barbuda for stock food and manure, the value of which may be taken at from £14 to £20.

Under these circumstances cotton growing appears to be highly profitable, and I would advise that as much land as can be satisfactorily looked after be placed under cultivation with this crop.

ST. VINCENT COTTON CROP.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, reports on the prospects of the cotton crop as follows:—

I have now visited all the chief cotton cultivations, and at the present time the outlook for the industry is very hopeful. As far as I can see the young plants are growing much sturdier than last year; to date very little disease has been noted.

Orders for cotton seed for planting are still coming to hand, but chiefly for small lots for supplying purposes. It may be of interest to add that, so far, the amount of seed selected, disinfected, and distributed from the Cotton Factory amounts to 25,844 lb., of which 13,984 lb. have been exported and 11,860 lb. sent out to local growers.

BARBADOS CO-OPERATIVE COTTON FACTORY.

The Barbados Co-operative Cotton Factory, Limited, was registered at Barbados on August 16 last, under the Companies Act, 1892.

The capital of the company is £1,000 divided into 2,000 shares of 10s. each.

The objects for which the company is established have already been outlined in the *Agricultural News* (Vol. IV, p. 209). The main objects, briefly stated, are as follows:—

- (1) To purchase the cotton factory and equipment;
- (2) to carry on in Barbados the business of cotton growers, cotton ginner, and dealers in cotton and cotton seed;
- (3) to make advances to cotton growers on account of cotton grown by them, and to purchase such or other cotton or its products.

VANILLA IN TAHITI.

The following note on the vanilla industry of Tahiti is extracted from the *Consular Report* on the Society Islands for 1904:—

While it must be conceded that Tahiti vanilla is inferior in quality to that of other countries, probably on account of the deterioration of the vine since its first introduction into this island from Mexico some thirty years ago, yet it is a fact that during the years 1897-1902 its exports and prices were sufficiently elevated to aid this colony in the maintenance of a fairly high state of commercial and financial prosperity. In the years 1897-9 its price varied from 9s. 5½d. to 5s. 2d. per lb.; decreased to 3s. 11½d. per lb. in 1900; advanced to 4s. 4d. per lb. in 1901, and fell to 2s. 11d. per lb. in 1902, since which date it has gradually declined to 1s. 0¾d. per lb. in 1904. It is generally admitted that this state of affairs has arisen in consequence of foreign markets having been flooded with an imperfectly cured and sometimes fraudulently packed article, forwarded hence by Chinese shopkeepers, who have procured the green beans from native growers and prepared them with insufficient skill and with undue haste for shipment. However this may be, it is true that the exports of Tahitian vanilla in 1902 amounted to 144½ tons, valued at £47,417, and that in 1904 it had decreased to 134½ tons, of the value of £15,969, a difference in the space of two years of 10½ tons in weight and of £31,448 in value. Recently some new vines from Mexico have been introduced into Tahiti, which may in time replace those at present in use.

COLONIAL PRODUCTS EXHIBITION AT LIVERPOOL.

The following information is extracted from the official publication issued by the promoters of the Colonial Products Exhibition to be held at Liverpool from January 30 to February 8, 1906:—

Judging from the cordial support extended to, and the amount of enthusiasm aroused by, the last two exhibitions—the first undertakings of the kind ever organized in Great Britain outside the Metropolis—it is a reasonable presumption that another, even on a still more extended scale, offering a greater diversity and larger number of colonial products, will achieve a still larger measure of success, and so promote the furtherance of a greater amount of commercial reciprocity between the colonies and the Mother Country. It might be said, *en passant*, that on all sides it has been agreed that the increase of business through the Liverpool Colonial Products Exhibition has been enormous, and no doubt H. R. H. the Prince of Wales recognized this fact when he graciously became a patron.

The resources of our colonies, mineral, agricultural, and manufacturing, increase rapidly as the time goes on, and no year passes but finds the over-sea portions of the empire in a better position to help to the attainment of that object, which it is the desire of every citizen to see realized—the establishment of the empire on a self-contained and self-supporting basis, independent of supplies from alien lands, and powerful to hold its own by the aid of its own people and by that aid alone.

That this aim can be accomplished there is little room for doubt, provided there be unanimity of feeling and mutual interests between the peoples of our colonies and ourselves; and it is difficult to discover any action on our part more valuable, helpful, and effective than endeavouring, as far as possible, to offer to the people of this country opportunities of realizing by personal inspection the vast commercial wealth of our colonies, as illustrated by the number and extent of the commodities with which they are able to supply us.

With this object in view it is intended to hold the third Colonial Products Exhibition from January 30 to February 8, 1906, which shall be more extended in its scope than the last, and for this purpose every effort will be made to obtain direct from each separate colony samples of each and every product it is able to supply.

With many months available for organization, preparation, and communication with the various colonial authorities, whose co-operation may be safely reckoned on, the President and Managers entertain sanguine hopes of producing a collection of colonial products, which, for extent and diversity, has never before been gathered together in one place on any previous occasion.

Those colonies and firms desirous of obtaining space in this forthcoming important exhibition should send in their applications as soon as possible to the Joint Managers at 9, Chapel Street, or 21, Water Street, Liverpool, where a plan of the hall can be seen and all information obtained.

It may be mentioned that the Secretary of the West India Committee has expressed to the Imperial Commissioner of Agriculture his readiness to do anything in his power to assist in securing the representation of the West Indies at the Liverpool Colonial Products Exhibition.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

VOL. IV. SATURDAY, OCTOBER 7, 1905. No. 91.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue discusses the agricultural prospects of Jamaica. As the result of his recent official visit, the Imperial Commissioner of Agriculture is satisfied that distinct progress has been made in agricultural matters of recent years.

Further information in regard to the adoption of the Naudet diffusion process by sugar estates in Madeira will be found on pp. 306-7. Also figures relative to the Trinidad cane-farming industry.

An account is given on p. 309 of the cultivation of tea at Ramble estate in Jamaica. This is the only tea cultivation in the West Indies.

Various short notes of interest to cotton growers will be found on pp. 310-1.

Under 'Insect Notes' an account is given of the cane-fly. This is not regarded as a serious pest to sugar-cane cultivation at Barbados, but in some years it occurs in rather large numbers. (See p. 314.)

Botanical notes on the 'Queen of Flowers' and a closely related plant, known as the 'King of Flowers,' with which it is sometimes confused, will be found on p. 317. This is followed by a short note on the lacebark tree.

An interesting letter from Dr. C. W. Branch to the Editor of the *Agricultural News* (see p. 318) discusses the subject of the inoculation of animals with anti-anthrax serum.

Show of Colonial Fruit in London.

It is desirable to remind readers of the *Agricultural News* that the next show of colonial fruit under the auspices of the Royal Horticultural Society will be held in London on December 5 and 6, 1905.

Reference to the note on p. 308 will show that provision is made for a number of exhibits in which fruit growers in the West Indies are interested.

This exhibition would appear to afford an excellent opportunity for again bringing West Indian fruits to the notice of the trade and other persons in the United Kingdom. Schedules and full particulars may be obtained of the Secretary, Royal Horticultural Society, Vincent Square, Westminster, London, S.W.

Exports of Grenada.

The Grenada *Blue Book* returns for 1904 show that the exports of cacao during the year amounted to 117,791 cwt., of the value of £272,226. The second industry in importance is spice growing. The value of the exports of nutmegs (5,908 cwt.) was £28,402; other spices were exported of a value of £5,364. One hundred and thirty-one packages of kola nuts were also shipped.

The exports of cotton, chiefly the product of the dependency of Carriacou, represented a value of £7,348; in addition, 6,843 cwt. of cotton seed were shipped, having an estimated value of £1,172.

No fewer than 2,430 live goats were shipped to other British West India Islands, their value being estimated at £530. Poultry to the value £442 was also exported.

Barbados Scholarship, 1905.

As was previously mentioned in the *Agricultural News* (Vol. IV, p. 284), the Barbados Scholarship for 1905 was won by Mr. C. K. Bancroft in natural science. Mr. Bancroft had a distinctly successful career in the science department at Harrison College. He joined the agricultural science class in March 1902, taking first place in the lower division of the class in the following December, with an average of 82 per cent. in all examinations. In December 1903, he took first place in the upper division of the class, when he was awarded the Diploma of the Department for proficiency in agricultural science.

In recommending that the Barbados Scholarship should be awarded to Mr. Bancroft, the examiners appointed by the Local Examinations and Lectures Syndicate of the University of Cambridge report that the two candidates offering Chemistry sent in papers of high merit in theoretical and practical work. 'The papers [in Botany] sent in by C. K. Bancroft were exceptionally good.'

It may be mentioned that in addition to the instruction received in the science department at Harrison College under Professor d'Albuquerque and Dr. Longfield Smith, Mr. Bancroft received private tuition in Botany from Mr. L. Lewton-Brain, B.A., F.L.S., formerly Mycologist on the staff of the Imperial Department of Agriculture.

Jippi-Jappa Hats in Jamaica.

An interesting minor industry of recent introduction in Jamaica is the manufacture of jippi-jappa hats. The plant from which the material for making these hats is derived is *Carludovica jamaicensis*, closely related to the Panama hat plant (*C. palmata*), an illustration of which was given in the *Agricultural News* (Vol. III, p. 310). This genus does not belong to the palm family but is more nearly related to the Aroids (screw pines, etc.).

The jippi-jappa plant grows freely in warm, humid districts of Jamaica, and it is suggested that it 'could be cultivated largely in its native districts, and in others, e.g., along the banks of irrigating canals in the banana plantations.'

It is stated in the current issue of the *Journal of the Jamaica Agricultural Society* that there is a large demand for the hats at paying prices. An inquiry was recently made for 6,000 dozen, which could not be taken up. It seems to be a pity that the exports are still comparatively trifling, as it is a suitable industry for women and girls in their spare time.

Exports of Turks and Caicos Islands.

The principal industries of these islands, which form a dependency of the colony of Jamaica, are salt production and the cultivation of sisal hemp. An account of the latter industry is given elsewhere in this issue. It will be seen that there was still a further increase in the output of sisal from the Caicos Islands, in spite of the fact that only one of the companies was in operation. Two companies are now working plantations.

For the salt industry the year 1904 was, however, a disastrous one. This was due to an excessive rainfall, for the success of the industry depends largely upon the absence of rain. In consequence, the rakings during 1904 were very short, the total output of salt from the dependency being only 686,500 bushels, compared with an average crop of 1,800,000 bushels.

West Indian Tobacco Industry.

An interesting article in the *West India Committee Circular* shows that tobacco has been well represented at the Colonial Exhibition. It is stated that the Golofina Tobacco Co. and Messrs. B. and J. B. Machado had two handsome cases and stalls, at which a brisk sale of Jamaica cigars and cigarettes was conducted. There were also other private exhibits from Jamaica, while in the Trinidad section a good display was made by the West India Cigar and Cigarette Co.

With regard to Jamaica cigars it is said: 'Samples of these cigars have been submitted to us and it does not appear to us surprising that by many connoisseurs they are preferred to even the best-known brands of Havanas.' London agents have been appointed by several of the firms mentioned above and it is anticipated that the trade in West Indian cigars

and cigarettes, inaugurated at the exhibition, will be successfully continued.

Much pioneer work has been done in Jamaica since 1898 in connexion with tobacco growing, and the industry appears now to be one of the most promising in that island. There are indications that Trinidad will also take up this industry on a fairly extensive scale.

St. Vincent Cotton Factory.

An interesting report recently received from the Agricultural Superintendent on the working of the cotton factory at St. Vincent shows that the factory was open from January 1 to September 23. During this period 281,606 lb. of seed-cotton were sent to be ginned, which gave 77,814 lb. of lint and 199,941 lb. of seed, or 27.6 per cent. of lint. The 77,814 lb. of lint were made up into 233 bales, the majority of which contained 360 lb. net. The amount of seed sent to be disintegrated was 4,204 lb.

The important work of selecting and disinfecting seed, also carried on at the Cotton Factory, was commenced on April 13. The amount of seed treated for local growers was 15,387 lb., which gave 11,860 lb. of selected seed.

For export and local sale 16,717 lb. of unselected seed were purchased from local growers whose cotton was particularly good and had realized 1s. 5d. to 1s. 6d. per lb. This seed after selection and disinfection gave 13,990 lb., the bulk of which was exported to other West India Islands.

West Indian Agricultural Conference, 1906.

It was stated on p. 280 of this volume of the *Agricultural News* that arrangements were being made for holding the next West Indian Agricultural Conference at Jamaica in January 1906. During his recent official visit to Jamaica the Imperial Commissioner of Agriculture received the assurance of the hearty co-operation of the various government departments and the leading planters of the island, and it was felt that the success of the conference was certain.

At the last moment, however, an unexpected difficulty has arisen. Owing to the recent changes announced by the Royal Mail Company in the itinerary of their ships, it is probable that the voyage from, say, Barbados to Jamaica will occupy ten to eleven days, instead of four days, as at present. This means that representatives from the other islands would require to be absent from their colonies for a period of about thirty to thirty-eight days. It is doubtful whether any representatives could afford to spend as much as, say, five weeks to attend a conference at Jamaica.

The idea of holding the next conference at Jamaica has not, however, been altogether abandoned. The various steamship companies are being communicated with, and it is hoped that, with the assistance of the Governments of the various colonies, some means may be devised for overcoming the difficulty that has now so suddenly arisen.



INSECT NOTES.

Insect Pests in Egypt.

A small volume entitled 'Notes on some Egyptian Insect Pests' by Mr. F. Fletcher, M.A., B.Sc., Deputy Director of Agriculture, Bombay Presidency, gives brief notes on general entomology and some of the more important insect pests in Egypt. The author does not claim to have prepared a complete hand-book either as to the number of pests or their life-history, but he gives useful notes on the most important pests and the remedies that have been found most useful in dealing with them. This should be valuable to planters, and a guide to all interested in the further study of Egyptian insect pests.

The Cane-fly.

In 1900 the cane-fly occurred on one estate in Barbados in large numbers in the months of August, September, and October. Reference was made to this outbreak in the *West Indian Bulletin*, Vol. II, p. 43. Since that time no outbreak of this pest has occurred, and in 1903 and 1904 it was so scarce that, although careful search was made, none of its breeding places were found, and its presence in the island was indicated only by a few adult insects captured from time to time. Recently, however, a slight attack has been observed on the same estate on which the canes were attacked five years ago.

The cane-fly (*Delphax saccharivora*) is a small Hemipterous insect, closely related to the plant lice (*Aphis*), the white fly (*Aleyrodes*), and the scale insects (*Coccidae*).

The adult cane-fly is about $\frac{1}{5}$ inch in length to the tip of the wings, of a pale-green colour, which becomes lighter toward the tip of the wings. The eyes are dark and conspicuous. The female is provided at the tip of the abdomen with a sawlike ovipositor, by means of which a small slit is cut in the epidermis of the cane leaf, and the eggs are laid in this slit, and the whole covered with a mass of flocculent white wax. If this wax be removed, the mass of eggs may be seen embedded in the cane leaf. After the eggs have hatched, the wound in the leaf is marked by a reddish spot.

The young cane-flies are without wings. They move very quickly when disturbed, and seem to prefer to walk side-wise or backwards rather than straight ahead. They are to be found mostly on the under side of the cane leaf, where they sometimes occur in great numbers.

The cane-fly feeds by sucking the juice of the plant by means of its proboscis in the same way that the plant lice and scale insects and other Hemiptera feed.

The first indication of an attack of the cane-fly will generally be the abundance of 'black blight' on the cane leaves. The masses of white wax covering the egg clusters are also conspicuous when the plants are examined more closely, and, later, a slight disturbance of the plants will set a cloud of adults flying, and the numerous, small, red marks on the leaves show where the eggs have been.

Planters in Barbados do not consider the cane-fly a serious pest. Even in 1900, when the pest occurred in large numbers, the cane fields most infested are said to have

given as good returns as other fields on the same estate only slightly attacked. It does not seem likely, however, that plants could support such an enormous number of insects and still give a normal return of juice. In Hawaii the leaf hopper of the cane (*Perkinsiella saccharicida*), a closely related insect with very similar habits, causes great injury to the sugar-cane. Reference was made to this pest in the *Agricultural News*, Vol. III, p. 154.

The cane-fly is attacked by several natural enemies, which are probably responsible for the scarcity of the pest in certain years. On the plants badly infested by the cane-fly this year were seen the red lady-bird (*Cycloneda sanguinea*) and numerous eggs of the lace-wing (*Chrysopa* sp.). The wild bee (*Polistes annularis*) was also frequently seen, apparently searching for food, but was not observed to eat any of the cane-flies.

It would be useful if any other outbreaks of the cane-fly in the West Indies were reported to the Imperial Department of Agriculture, in order that more complete records may be made of the occurrence of this pest and the damage done by it.

Hair-follicle Mite of Pigs.

The hair-follicle mite is a microscopic animal that lives in the skin at the base of the hairs. It is closely related to the ticks and itch mites, and different species or varieties infest different animals. The variety attacking man causes the spots in the skin of the face, commonly called 'black-heads,' while the varieties found on the dog and on the hog produce a serious disease. A variety occurring on cattle sometimes damages the hides so as to render them unsaleable.

A portion of the skin of a hog was recently sent to the office of the Imperial Department of Agriculture from the Barbados slaughter house by Dr. Stoute. This was seriously affected with the hair-follicle mite of the hog (*Demodax folliculorum suis*). Each infested hair-follicle was enlarged to form a cavity which contained a mass of semi-fluid matter in which the mites were found in large numbers. These masses were of a greyish or yellowish colour, varying in size, some of them so small as to be hardly visible, to about $\frac{1}{4}$ inch in diameter.

This is not a common pest in these islands, so far as is known, and it is interesting that the first case to attract attention should be one in which the infestation was so very complete, occurring, as it did, in the skin on all parts of the body. It is not believed that this parasite is transmissible to man, nor that it affects any part of the flesh so as to render it unfit for use as food, provided the skin and the parasites be carefully removed.

In the event of a serious infestation by this parasite the use of washes and dips, such as are recommended for controlling cattle ticks, would probably be found useful. (See *Agricultural News*, Vol. III, p. 247.)

Corn Ear Worm. In the *Agricultural News* (Vol. IV, p. 90) it was suggested that the corn ear worm might be controlled by sprinkling into the crown of the plant a mixture of Paris green and corn meal. Recently, several planters have reported good results from dusting the corn with Paris green and lime in exactly the same way as cotton is dusted for the cotton worm. The eggs of the corn ear worm are laid on the under side of the leaf of the young corn, and the caterpillars feed there for some time before entering the crown of the plant, and Paris green applied at this time kills them before any damage is done.

EDUCATIONAL.

Agriculture in Elementary Schools.

The following note appeared in the *Barbados Bulletin* of September 28:—

Professor Davenport, Dean of the College of Agriculture of Illinois, U.S.A., gives as the principal reasons why agriculture should be taught in the public schools the following: (1) to instil a love and respect for the land, and the occupation of agriculture; (2) to instil respect for industry in general; (3) to cultivate the active and creative instinct; (4) to give practice and experience in success and failure; (5) to connect the school with real life; (6) to stimulate and train the powers of observation; (7) to make an avenue of communication between the teacher and the pupil; (8) to train the independent methods of acquiring information.

Barbados.

The following extract relating to the teaching of the principles of agriculture in elementary schools at Barbados is taken from the Annual Report of the Education Board for 1904:—

The subject of agriculture is making steady progress in the schools. Where land is not available for school gardens, plants are in many instances grown in pots and boxes. The Board beg to express their thanks for the assistance they have received in this matter from Sir Daniel Morris. The effects of the lectures delivered by members of the staff of the Imperial Department of Agriculture are now being seen.

The £20 granted by the Legislature for the purchase of chemicals and apparatus for simple agricultural experiments was expended by the Board, and about twelve teachers received instruction from Dr. Longfield Smith in the use of the apparatus provided. The experience gained, however, does not warrant the Board in again expending this grant on similar articles. They propose to equip school gardens as far as the grant will go annually with agricultural implements such as hoes, rakes, forks, etc.

Jamaica.

To the Annual Report of the Superintending Inspector of Schools in Jamaica for the year ended March 31 last, is appended an interesting report by Mr. J. R. Williams, M.A., on the 'Teaching and practical work in agriculture in Trinidad and the neighbouring islands.' Mr. Williams, it will be remembered, was one of the representatives from Jamaica at the last West Indian Agricultural Conference.

After dealing with the work in progress in Trinidad, Mr. Williams states his general impressions and makes suggestions as follows:—

I am strongly of opinion that in equipping the teacher with the knowledge and interest needful for successful agricultural work in the schools, we have done more in Jamaica than I have heard of elsewhere: I mean in the attention devoted to agricultural science of late years in the Training Colleges and in the annual special courses at the Mico. I believe this to have been most necessary work—the preparation of the teachers. The failure of our attempt to get practical work in agriculture in the schools in 1895 and later was largely due to the teachers' unpreparedness, their lack of interest in the work, and

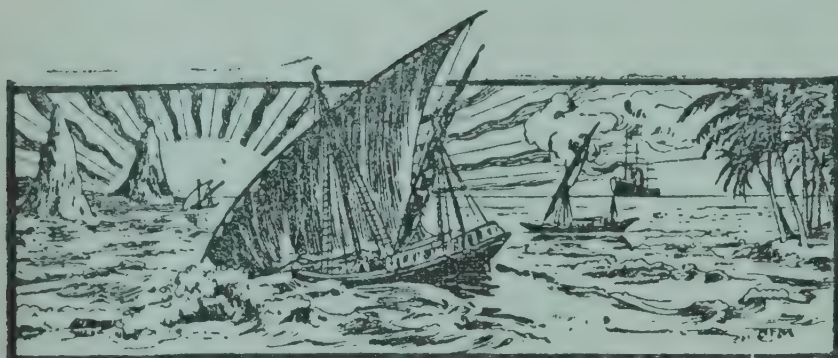
their lack of confidence in themselves. Another part of the needful preparation has been the education of the outside public, the parents of the children; thanks to the efforts of the Agricultural Society, a good deal has been done to this end. The school gardens which I saw in Trinidad were unfortunately visited just at the worst time. The school shows came off in November and December, and I was told that their crops had been gathered then, and no fresh work undertaken since; they would now all immediately resume practical work. I could not, however, see proof that better work has been done in these gardens, or in the town schools which confined their efforts to pot culture, than in our schools. One of the important lessons school gardens should teach is the possibility of some culture going on all the time, and there were few signs in the way of nurseries, manure heaps, grafted and budded, and pruned plants, of efforts superior to the average of our efforts. Mr. Collens, when I showed him what we aim at, as it is set forth in Article 112 of the Code and p. 25 of the 'Instructions' to Inspectors, and inquired how far it represented the ideal in Trinidad, remarked that it would be very satisfactory if such work could be got, and said he intended to make use of the instructions in his department.

My opinion, therefore, is that we are now in a better position than most of our neighbours to embark successfully on the development of agricultural teaching, and particularly such practical exemplification of it as schools can properly undertake: that what we specially need now is development and more practical work, and I believe that what is mostly needed to secure this is to make our requirements and regulations a little less formal and exacting. I think it will be disastrous to pull our present plant up by the roots or to alter our ideal.

BEE KEEPING AT ST. LUCIA.

The following note, showing the progress in the bee-keeping industry at St. Lucia, is extracted from the Annual Report of the Agricultural Instructor:—

In 1902 there were seventy colonies of bees in St. Lucia; in 1903 these were increased to 135; in 1904 to 250; and at the time of writing there are 400 colonies, nearly all of which are worked for extracted honey. The crop of 1904, although late, commencing in May, proved a fair one, and about 4 tons of honey were exported in addition to local sales. The quality was not high, some of it being extracted before being thoroughly ripened, and the colour a dark amber, the flavour being fairly good. I happened to be in London when the first consignment arrived and was disappointed to find the Mincing Lane valuation to be not more than 15s. in barrels and 17s. in cases. I made arrangements for private sales of 2 tons at 40s. per cwt., less cost of advertisements, railway carriage, repacking, etc., etc., the net return being 25s. per cwt. These figures give some idea of the immense profit realized by middlemen dealing in honey, and it would appear profitable for West Indian honey producers to combine and avoid the middleman entirely. The English consumer seldom buys a pound of honey for less than 1s. I had several opportunities of sampling English honey and found it was not one whit superior to West Indian. Theoretically all West Indian honey is only fit for manufacturing purposes, yet much of it is bottled and sold for from 1s. to 1s. 6d. per lb. as English honey. Our exports this year will be nearly all in 5-gallon tins and thoroughly ripened, the crop prospect is good and some honey has been lately sold at public sale for 23s. per cwt.; by private sale as much as 56s. per cwt. is being realized.



GLEANINGS.

During the fortnight ended September 7, 56 bales of West Indian cotton were imported into the United Kingdom. (*West India Committee Circular.*)

Fresh seed of English vegetables and Tenerife onion seed, both red and white varieties, can be purchased at the Botanic Station at Dominica.

The Superintendent of the Royal Botanic Gardens, Trinidad, offers for free distribution a limited number of plants of *Coffea robusta*, obtained from the Congo River. This coffee is said to be of excellent quality and appears to be well suited for cultivation in the lowlands.

The West India Committee proposes to issue a souvenir of the Colonial and Indian Exhibition, embodying articles descriptive of the exhibits, a comprehensive report on the Exhibition, and articles emphasizing the lessons to be learnt from it.

The Curator of the Botanic Station at Tobago writes that plants of Sea Island cotton at Golden Grove estate are in a very promising condition, averaging 4 to 5 feet in height. This is the only estate in Tobago that has taken up cotton growing to any extent.

A plant with bright yellow flowers, believed to be *Cassia multijuga*, is now in flower in Jamaica and Trinidad. It is an ornamental tree, growing to a height of 15 to 20 feet, and might well be introduced into other parts of the West Indies where it does not occur.

Among the winners of medals in Jamaica at the Colonial Exhibition was a peasant proprietor in the Glengoffe district, whose exhibit of cacao was awarded a silver medal. 'He is,' says the *Daily Telegraph*, 'a living proof of the value of the work which has been, and is still being, performed by the Jamaica Agricultural Society.'

The *Consular Report* on Cuba for 1904 states: 'According to an official report recently published, the mean cost of covering an acre of land with cheese-cloth [for artificial shelter for tobacco plants] is about £60, and the results appear to show that the larger yield, especially of fine leaves suitable for wrappers, warrants the extra outlay.'

Statistics given in Messrs. Henry W. Frost & Co's. 'Sea Island Cotton Circular' show that the consumption of Sea Island cotton in the United States has greatly increased, 'the northern and southern mills taking 63,430 bales, against 39,224 bales last year, being nearly the entire increase in the crop over the previous year.'

The number of visitors at the Colonial and Indian Exhibition from the opening day to Saturday, September 9, amounted to 966,325. (*West India Committee Circular.*)

A writer in the Demerara *Argosy* states that carbon bisulphide, the use of which was recommended by the Board of Agriculture, has been found effective and expeditious in ridding farms of the 'cushie' ants.

The crops of selected varieties of rice at the British Guiana Botanic Gardens ranged from 15 to 20 bags of paddy per acre. Seed of the best kinds is available for distribution to bona fide cultivators in small quantities.

It is gratifying to note that the shipment of green limes is being carried on in Montserrat. About 2,800 small crates (1 cubic foot) have been shipped since July last. If this industry develops, it should be of considerable benefit to the island.

A number of planters in Surinam, who are destitute owing to the crisis in the cacao industry, are petitioning the Government to grant them the free use of land on which to apply themselves to small farming. Money loans, to be repaid within twenty years, are also asked for.

It is of interest, in view of the efforts made by the West India Committee to establish a trade in green limes in England, to note that the Director in Trinidad of the British West India Fruit Co., Ltd., is advertising for limes for shipment to England.

At Marseilles, according to *Tropical Life*, there are a number of factories working to meet the world's demand for 'vegetaline,' 'cocoaline,' and other dietetic products of the cocoa-nut. A single factory increased its output in two years from 25 tons to 6,000 tons a month.

To avoid difficulties in the germination of vegetable seeds, the *Journal of the Jamaica Agricultural Society* advises the following: 'Take fresh wood-ashes, damp them with kerosene, then rub the seeds into the paste made in this way. If care is taken not to make the paste too wet but to rub every seed thoroughly with the ashes damp with kerosene, no ants or other pest will trouble them.'

Reporting on the pine-apple plot at the Rivière Dorée Experiment Station, St. Lucia, the Agricultural Instructor states that the Black Antigua variety is well adapted to dry, wind-swept lands, and deserving of attention from planters. An experimental shipment in barrels netted 3½d. per pine. From the plot 1,200 suckers were distributed to one planter who has now a promising cultivation, and 2,400 suckers have lately been obtained to start a new plot at Gros Islet.

The London *Fruit Grower* has attributed the 'unpleasant visit of the mosquito to our shores this summer to the imported bananas from South and Central American Ports.' Considerable newspaper discussion has arisen out of this as to the possibility of the visit of mosquitos being connected in any way with the importation of bananas. The matter might be easily settled by reference to experts, who would be able to state whether the species of mosquitos noticed this summer are different to the ordinary forms and possibly indicate the country of origin.



ST. KITT'S-NEVIS: REPORT ON ECONOMIC AND OTHER EXPERIMENTS, 1904-5.

This report on economic experiments carried on in connexion with the Botanic Station is supplementary to the annual report on the Botanic Station for the year ended March 31, 1905, which was reviewed on p. 269 of this volume of the *Agricultural News*. In the case of the economic experiments with sweet potatoes, yams, and eddoes, trials were made of a number of varieties with the view of testing their relative merits. Twenty kinds of sweet potatoes and eleven of yams were tested in the plots.

Successful experiments in growing tobacco have been carried on at St. Kitt's since 1901. The experiment was particularly successful in the year under review, 155 lb. of cured tobacco being reaped from the plot, which was about $\frac{1}{5}$ acre in area. Of this amount 105 lb. have been sold at 1s. 2d. to 1s. 3d. per lb., realizing £6 in all.

Particular interest attaches to the section of this report which deals with the cotton industry. Mr. Shepherd's record of the year's work is decidedly encouraging. Growers purchased 4,315 lb. of Rivers' Sea Island cotton seed through the Department, while 300 lb. were distributed gratuitously in Anguilla. The area under cotton in St. Kitt's was 1,057 acres. In this matter St. Kitt's occupies a somewhat unique position, in that cotton is grown almost entirely as a catch crop on cane lands, thereby much reducing the cost of cultivation. The results have apparently been satisfactory, as there are indications that the area under cotton will be extended during the present season. The exports of cotton from St. Kitt's-Nevis and Anguilla for the fifteen months ended March 31 last amounted to 166,148 lb. of the estimated value (at 1s. per lb.) of £83,074.

GRENADA: REPORT ON BOTANIC STATION, 1904-5.

The sales of plants and seeds during the year under review realized £57 17s. 10d. This sum is an increase of £12 18s. 1d. on last year's receipts.

The rainfall for the year was 70·82 inches, or 11·55 inches less than in the previous year.

There was a slight increase in the total number of economic and other plants sold and distributed free from the station. The number was 6,863. In addition, 329 lb. of Sea Island cotton seed were sold.

In the experiment plots attached to the station crops of a number of economic plants were grown. The cotton obtained a first prize at the local Agricultural Exhibition. The manurial plots with cacao in the country districts were abandoned; but a new series is at present being arranged.

Although the work at the station has been much hampered by the staff changes, the general condition of the station appears to be fairly satisfactory.

As has been previously announced in the *Agricultural News*, the Agricultural Department at Grenada has been entirely re-organized. Full particulars of the new arrangements were published on p. 158 of the present volume.

SCIENCE NOTES.

Souari or Butter Nut.

Mention is made by Mr. J. R. Jackson in his monthly report on the London drug and spice market (see p. 319) of the sale of 5 barrels of Souari or butter nuts. These are the product of a tree known as *Caryocar nuciferum* found in the forests of British Guiana. The tree, which is grown in several of the West India Islands, frequently attains a height of 100 feet. The fruit is a large, four-seeded drupe. The seeds have a hard shell and are about the size of a hen's egg. They have a pleasant flavour and yield on crushing an edible oil. The wood of the tree has been used principally in ship building.

Queen of Flowers.

It would appear that some confusion exists as to the tree which is known by the name of 'Queen of Flowers' or 'Queen's Flower.' Its botanical name is *Lagerstroemia Flos-Reginae*. A note on this handsome, showy tree, which is a native of Ceylon, appeared in the *Agricultural News*, Vol. II, p. 170. It is a large tree, sometimes attaining a height of 50 feet.

The name 'Queen of Flowers' is sometimes erroneously applied to another member of the genus, viz., *L. indica*. This is common in West Indian gardens and is known as the 'King of Flowers.' It is a shrubby plant, growing to a height of 8 to 10 feet. It usually has bright, rose-coloured flowers, but there is also a less common variety with white flowers. *Lagerstroemia indica* is usually propagated by cuttings from the roots.

Lace-bark Tree.

The lace-bark tree (*Lagetta lintearia*), a native of Jamaica, is a slender tree, growing to a height of 20 to 30 feet, and belongs to the natural order *Thymelaeaceae*. The so-called lace is obtained from the inner bark of the tree, which is composed of numerous fibres interlacing in all directions.

Dr. Masters states in the *Treasury of Botany*: 'It is reported that Charles II received, as a present from the Governor of Jamaica, a cravat, frill, and pair of ruffles, made of this material; and to this day it is used for bonnets, collars, and other articles of apparel, specimens of which may be seen at the Kew Museum, etc.'

Residents in the West Indies are familiar with the many pretty articles made from this fibre, which are quite a feature of the curiosity shops, especially in Jamaica. Among these may be mentioned the puffs or dusters with hollow handles, and riding whips. The latter are 'made from cuttings of the smaller branches of the tree. A section of each cutting is stripped, the woody part removed, and the loose bark is then plaited to form the thong and lash.' (Wortley in *Souvenirs of Jamaica*.) But, perhaps, a better-known use, to which the product of this interesting tree is put, is in making various descriptions of fancy work, such as d'oyleys, lamp-shades, fans, etc.

Reference was recently made in the *Jamaica Times* to the fact that the supply of the lace-bark tree was in danger of becoming exhausted. In reply, the Superintendent of Hope Gardens writes that large numbers of the tree exist in almost inaccessible parts of the 'Cock-pit Country,' and that it would not be difficult to prevent the wanton destruction of it if instructions were given by the Government to custodians of Crown Lands. Plants are for sale at the Hope Gardens at 1d. each.

ANTHRAX INOCULATION.

To the Editor of the *Agricultural News*.—

Sir,—During the discussion on anthrax at the Agricultural Conference in Trinidad, published in the last issue of the *West Indian Bulletin*, reference was made to immunization with Pasteur's vaccines. This process, as was there mentioned, consists in the inoculation of an animal with cultures of anthrax bacillus of two degrees of attenuation. It has the disadvantages of often producing severe illness and sometimes death.

The experiments on the Prussian Royal Farms did not give as encouraging results as were reported from France. Notwithstanding, the method has been freely used and with benefit in many places.

Sclavo, of Siena, has succeeded in obtaining an anti-toxic serum from animals immunized on Pasteur's plan. He now uses an ass which is periodically bled to supply the serum, and periodically inoculated with anthrax to keep up the immunity. Sclavo's anti-anthrax serum, where obtainable, has displaced the treatment by excision of malignant pustule in man; and in Italy industrial anthrax has to a great extent lost its terrors.

Sobernheim applied this principle to the treatment of animals, but with little success, because of the rapid course of the disease. He found, however, that a dose of virulent anthrax injected simultaneously with anti-anthrax serum is innocuous. The animal receives the bacilli in a potent state but is cured by the serum. It obtains in this way a higher and more lasting immunity than is conferred by Pasteur's method, and with less risk. Extensive experiments were carried out in Saxony in 1900-2, during which 2,700 cattle were immunized without a single death or serious illness as the result of inoculation, even in very young animals. This method of immunization consists practically in the simultaneous injection into different parts of the animal of Sclavo's serum and Pasteur's vaccine no. 2. After securing the first immune animal it is quite practicable in a colony like Trinidad to prepare Sclavo's serum, and keep anthrax cultures going at very little expense.

When inoculating animals either by Pasteur's or Sobernheim's methods, it should be borne in mind that they are thereby infected with anthrax; precautions should, therefore, be taken to quarantine them and to disinfect their dung and litter for some days until they may be supposed to be free of infection. Sobernheim found bacilli in the blood of immunized sheep twelve days after they had been harmlessly inoculated with large doses of anthrax.

With reference to anthrax in St. Vincent, I am pleased to be able to report that some measures are being taken to limit the spread of the disease. Under an old Animals' Disease Ordinance rules have been framed, which prohibit the flaying of animals except such as are regularly slaughtered for food or have died as the result of a manifest accident. The death of every beast from disease is reported to the police who take from the body a drop of blood and make an ordinary blood smear on a glass slide. This is forwarded to me by post or special messenger for examination. In this way, since we began, four sporadic cases of anthrax have been diagnosed and appropriate steps taken for disinfection.

With the co-operation of the public, the Government should be able, now that there is no epidemic, gradually to eliminate the points of infection.

Yours, etc.,

(Sgd.) C. W. BRANCH.

St. Vincent,
September 21, 1905.

SISAL HEMP.

In the following brief note the *Tropical Agriculturist* gives some of the more important facts in regard to the cultivation of sisal hemp:—

Native of Yucatan, Mexico, etc. Cultivated in these countries and in the West Indies, Florida, and India for its fibre, which is straight, clean, yellowish, and very good for cordage, approaching Manila hemp. It is also easily prepared by machinery, no retting being needed.

It will grow in almost any soil or situation, but succeeds best and gives the best yield of good fibre when grown on dry, sandy, stony land exposed to the full sun, without any shade whatever. On richer, wetter land it grows larger, but the fibre is not so good.

It is propagated from suckers or from the bulbils that form on the great flowering stalk. They are first planted in a nursery, and then set out when about 15 inches high. Plant in rows about 7 to 11 feet apart, and 5 to 6 feet apart in the row. With the larger distances mentioned, 650 plants cover an acre.

The leaves should be ready for cutting in about four years. They are cut by coolies with long knives or cutlasses. The plant if left untouched lives about six or seven years, but if the leaves are regularly cut, about fifteen years. The yield in Yucatan is about 1,000 to 1,500 lb. of fibre per acre; 1,000 leaves give from 50 to 70 lb. of fibre. The price of the fibre upon the market is very variable. It was £36 per ton a few years ago, but probably about £26 to £30 represents its value if regular and moderately large supplies were available.

SISAL HEMP IN THE CAICOS ISLANDS.

The *Annual Report* on the Turks and Caicos Islands has the following reference to the progress of the sisal hemp industry in the dependency:—

The fibre industry at East Caicos, owned by an American company, is in a sound condition, and continues to turn out a quality of fibre commanding a good price in the American market.

The company commenced work about thirteen years ago. Their shipment of fibre in 1895 was 92,071 lb., valued at £1,342. In 1902 their output increased to 189,936 lb., valued at £2,769; in 1903 to 296,733 lb., valued at £4,327; and last year to 462,423 lb., valued at £6,743.

The fibre industry at West Caicos, which was closed towards the end of 1903, was again taken up towards the end of 1904 by a new company formed in London. With careful management, the industry on this plantation should not be without success.

The total quantity of fibre exported last year from the Caicos Islands, which, practically speaking, is the output of the one plantation at East Caicos, amounted to 463,695 lb., valued at £6,886, compared with 454,193 lb., valued at £6,563, during the previous year, when the two plantations were at work for the greater part of the year.

Goats for Sale at Barbados. As there would appear to be some demand in the West Indies for half-bred Toffenberg goats, it may be of interest to mention that Mr. J. A. Farmer, of Halton estate, Barbados, will have for sale, shortly, two pairs of the descendants of the Department's goat 'Black Rock.' Inquiries may be addressed direct to Mr. Farmer as above.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice markets for the month of August has been received from Mr. J. R. Jackson, A.L.S.:—

As might be expected during the height of the summer season and especially in the month of August, trade in Mincing Lane is in almost a comatose condition. Consequently, the drug and spice markets show but little change in the prices which prevailed in the previous month, and with a decreasing demand.

GINGER.

At the spice sale on August 2 some 300 packages of Jamaica were offered, of which only eighteen sold at 62s. for good washed, and 36s. for ordinary washed. Eight hundred and fifty packages of Cochin and Calicut were also offered, a very few of which were sold at preceding rates: washed rough Cochin being bought in at 20s. to 21s.; and rough Calicut at 24s. A fortnight later no Jamaica was offered, but 298 bags and 10 cases of Cochin and Calicut were bought in at the following rates: bold, but wormy and scraped, 65s.; washed rough dull medium and small, slightly wormy, 22s.; and rough lean, 18s. One hundred bags of Japan were also offered and bought in at 18s. Again on the 23rd., Jamaica was not represented; about thirty packages of Cochin and Calicut, out of a total of 200, were disposed of, including small and mouldy washed rough Cochin at 18s., and medium and small native cut at 37s. 6d.

NUTMEGS, MACE, PIMENTO, AND ARROWROOT.

Of nutmegs the month opened with steady supplies and quiet sales. On the 16th., 360 packages of West Indian were offered, the bulk of which was disposed of at firm, though somewhat irregular rates; and at the close of the month no alteration had taken place. The supply of and demand for mace remained steady during the month. And the same may be said of pimento. Of arrowroot the sales for the month included about 1,100 barrels of St. Vincent at prices from 1½d. to 1¾d. per lb.

SARSAPARILLA.

At the beginning of the month 6 bales of Lima-Jamaica in original wrappers and packing were offered, one of which was sold at 1s. per lb. for coarse, 1s. 3d. being asked for fair. Jamaica sold at firm and unchanged rates; fair grey to slightly coarse realizing 1s. 3d. to 1s. 4d., and common 1s. 2d. At the sale on the 17th., 4 bales of fair Lima-Jamaica fetched 1s. 1d. per lb. Honduras was limited at 1s. 3d., and for 3 bales of fair reddish to dull native 10d. was paid. But little or no changes occurred at the end of the month. Grey Jamaica still continues rare.

LIME JUICE, TAMARINDS, AND SOUARI NUTS.

At the first sale 9 puncheons of raw Jamaica lime juice were sold at 11d. per gallon, and 2 other puncheons at 1s. A fortnight later 8 puncheons of common raw Jamaica were disposed of at 3d. to 8d. per gallon. West Indian tamarinds, at the sale on August 2, were disposed of at dearer rates, fair Antigua in bond realizing 13s. 6d. to 14s. per cwt., and squashy Barbados were bought in at 15s. On the 16th., 58 packages of Antigua in bond were sold at 13s. to 13s. 6d.

An unusual article at the sales on the 17th. came from Demerara, in the shape of 5 barrels of Souari or butter nuts (*Caryocar nuciferum*), of which all were disposed of at 10s. per cwt.

RAT VIRUS IN DOMINICA.

Reports from the planters and others who have experimented in Dominica with the Liverpool rat virus, sent out by the Imperial Department of Agriculture, show that this has been very successful in controlling the plague of rats, which do so much damage to many of the growing crops of the island. Mr. J. Jones, Curator of the Botanic Station, states that the bread soaked in the virus and placed in the loft above the potting shed was devoured the very first night, and three weeks afterwards not a rat was to be seen or heard, by day or by night. When the loft was turned out, no rats could be found, which therefore shows that the virus has proved successful in clearing the building of these pests.

Dr. H. A. A. Nicholls, C.M.G., Roseau, states that the rats infesting the buildings entirely disappeared after using the virus. Infected toast and maize were placed amongst cacao trees and the rats left the neighbourhood, but satisfactory conclusions cannot be drawn from this fact as mango trees were bearing in the vicinity and possibly the rats may have left the cacao for the mango fruit.

Trial of the virus was also made in the buildings of the Agricultural School, Morne Bruce, and the Officer-in-Charge is of the opinion that it is much more rapid in its action than the instructions on the tubes state, and that if the virus could be distributed every three months, there would be no further difficulty in keeping the buildings free from these pests.

Mr. P. F. Cox, Belvidere, eulogizes the use of the virus amongst cacao trees, finding very few pods touched by the rats, whereas his loss last year through these pests was at least 4 bags. He finds that infected corn gives better results than bread, but points out that it is of small use his destroying the rats while they are cultivated by his neighbours. Through the good offices of his Excellency the Acting Governor, the virus is to be imported in a fair quantity and sold at cost price to the planters, so that co-operative efforts may be made against the pests, and the good results so far obtained should then be of a more permanent nature.

So far twenty-seven tubes have been sent to Dominica through the Imperial Department of Agriculture and the results appear to be very favourable, for although few dead rats are seen, their depredations are greatly reduced.

TOBACCO IN ST. KITTS.

Experiments in growing and curing tobacco have been carried on at the La Guerite Experiment Station for some years, the first being started in 1901.

This year the seed was sown in August 1904 in boxes protected from the attacks of ants, and in September the young plants were put out in shallow furrows 3 feet apart.

The high winds that prevailed towards the end of the year did much damage to the leaves, notwithstanding the erection of a temporary wind-break. The first cutting of the ripe leaves was made on December 1, and continued as the leaves were fit. The curing was carried out on the lines recommended in the *Bulletin of the Department of Agriculture, Jamaica*, and has, so far, been successful.

A sample of the cured leaves sent to the Imperial Commissioner of Agriculture was well reported on by a local firm in Barbados as being equal to the best quality grown there.

From the area reaped—just about ½ acre—105 lb. of cured tobacco have been sold, realizing £6, or at the rate of 1s. 2d. to 1s. 3d. per lb., and there are now on hand for sale 50 lb. This makes a total amount of 155 lb. cured tobacco from ½ acre, or at the rate of 775 lb. per acre.

MARKET REPORTS.

London,—September 14, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 8, 1905; and 'THE PUBLIC LEDGER,' September 9, 1905.

ALOES—Barbados, 15/- to 45/-; Curaçoa, 15/- to 60/- per cwt.
ARROWROOT—St. Vincent, 1½d. to 1¾d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/5½ to 1/6 per lb.
BEES'-WAX—£7 12s. 6d. to £8 5s. per cwt.
CACAO—Trinidad, 54/- to 57/- per cwt.; Grenada, 48/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.
COTTON—West Indian, medium fine, 6·10d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 5/6 per bunch.
GRAPE FRUIT—12/- to 13/6 per box.
LIMES—4/6 to 6/- per box.
ORANGES—Jamaica, 17/- to 18/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, low middling to middling, 46/- to 47/-; good ordinary small, 42/- per cwt.
HONEY—17/- to 23/6 per cwt.
ISINGLASS—West Indian lump, 2/2 to 2/7; cake, 1/- to 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 9d. to 1/1 per gallon; concentrated, £18 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/8 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair to good bold pale, 1/4 to 1/10; red, 1/1 to 1/2 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.
NUTMEGS—75's, 11d.; 80's, 10d.; 101's to 110's, 7½d.; 127's, 6d.; and in shell at 4½d. to 5d.

PIMENTO—2½d. to 2¾d. per lb.
RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 17/- per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 12/- to 14/6 per cwt.

SULPHATE OF AMMONIA—£12 8s. 9d. to £12 10s. per ton.

Montreal,—August 10, 1905.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$22·00 to \$24·00; Trinidad, \$19·00 to \$21·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

LIMES—Jamaica, \$6·00 per barrel.

MOLASCUIT—Demerara, \$1·32 per 100 lb.

MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 20c. per lb.

PIMENTO—Jamaica, 5c. to 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2·60 to \$2·85 per 100 lb.

—Muscovados, 89°, \$2·10 to \$2·35 per 100 lb.

—Molasses, 89°, \$1·85 to \$2·10 per 100 lb.

—Barbados, 89°, \$1·95 to \$2·10 per 100 lb.

New York,—September 1, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11¼c. to 12c.; Grenada, 11¼c. to 11½c.; Trinidad, 11½c. to 11¾c. per lb.

COCOA-NUTS—Jamaica, \$26·00 to \$28·00; Trinidad \$26·00 to \$29·00 per M.

COFFEE—Jamaica, 8½c. to 9c. per lb. (ex store).

GINGER—Jamaica, 8c. to 9c. per lb.

GOAT SKINS—Jamaica, 57c. per lb.

GRAPE FRUIT—\$6·00 to \$8·00 per barrel.

LIMES—\$3·00 to \$4·00 per barrel.

MACE—28c. to 31c. per lb.

NUTMEGS—West Indian, 80's, 23c. to 24c.; 110's, 15½c.; 120's to 130's, 11c. to 12c. per lb.

ORANGES—\$5·00 to \$6·00 per barrel.

PIMENTO—4¾c. per lb.

PINE-APPLES—8c. to 12c. per barrel.

SUGAR—Centrifugals, 96°, 3½c. to 4c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—September 25, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·50 per 100 lb.

CACAO—\$11·00 per 100 lb.

COCOA-NUTS—\$9·25 to \$14·00 per M. for husked nuts; \$8·50 for nuts in husks.

COFFEE—\$10·50 to \$11·00 per 100 lb.

HAY—95c. to \$1·10 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Special cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, \$2·24 to \$3·25 per 100 lb.

POTATOS, ENGLISH—Bermuda, \$2·50 per 160 lb. (retail).

RICE—Ballam, \$4·20 to \$4·75 per bag (190 lb.); Patna, \$2·86 to \$3·20; Seeta, \$3·26; Rangoon, \$2·50 to \$2·55 per 100 lb.

SUGAR—Yellow crystals, \$4·25 per 100 lb.

British Guiana,—September 18, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 14c. per lb.

CASSAVA STARCH—\$5·00 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—Rio and Jamaica, 13¼c. to 13½c. per lb. (retail).
—Creole, 14c. per lb.

DHAL—\$3·90 per bag of 168 lb.

EDDOES—\$1·20 per barrel.

ONIONS—Madeira, \$2·70 per box of 100 lb., ex ship; Tenerife, 1½c. to 2c. per lb. (retail).

PEA NUTS—American, 5½c. per lb. (retail).

PLANTAINS—12c. to 28c. per bunch.

POTATOS, ENGLISH—2½c. to 2¾c. per lb.; Tenerife, 2¾c. per lb. (retail).

POTATOS, SWEET—Barbados, \$1·20 per bag.

RICE—Ballam, \$4·40 to \$4·50 per 177 lb.; Creole, \$4·30 to \$4·40 per bag.

TANNIAS—\$1·20 per barrel.

YAMS—White, \$3·00; Buck, \$3·36 per bag.

SUGAR—Dark crystals, \$2·35 to \$2·40; Yellow, \$3·40; White, \$4·50; Molasses, \$2·40 to \$2·50 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—September 19, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·25 to \$11·50; estates, \$11·50 to \$12·00 per fanega (110 lb.); Venezuelan, \$11·25 to \$11·90 per fanega.

COCOA-NUTS—\$20·00 per M., f o b

COCOA-NUT OIL—67c. per Imperial gallon (casks included).

COFFEE—Venezuelan, 10c. per lb.

COPRA—\$2·90 to \$3·00 per 100 lb.

ONIONS—Stringed, \$2·00 to \$2·30 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·00 to \$2·15 per 100 lb.

RICE—Yellow, \$4·25 to \$4·50; White, \$4·50 to \$5·60 per bag.

SUGAR—White crystals, \$4·00 to \$4·50; Yellow crystals, \$3·00; Molasses sugars, \$2·50 to \$3·00 per 100 lb.



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Sea Island Cotton in the West Indies.

IN a recent issue of the *Agricultural News* information was published in regard to the prospects of Sea Island cotton in South Carolina. The crop there is usually brought to a close

by early frosts in October or November. These kill the plants and thus destroy the possibility not only of obtaining further pickings but also of ratooning the plants, as unfortunately is being done in some localities in the West Indies.

As has already been pointed out, the practice of ratooning Sea Island cotton lately adopted at Barbados and elsewhere is rapidly assuming the form of a serious menace to the success of the industry. The planters in South Carolina, whether they wish it or not, are compelled to abandon their cotton fields as soon as the frosts come, and the cutlass and fire-stick should perform a similar service in the West Indies and bring to a definite close the life of all cotton bushes as soon as they have occupied the land for one whole year. After that period has elapsed insect and fungoid pests are present in such numbers that the crop must, in any case, be small in quantity, and we know by experience this year that the quality, also, is measurably affected. Short and immature fibres appear in larger proportion and the character of the lint is appreciably lowered. We shall probably hear more of this later, when the account sales for the ratoon cotton recently shipped come to hand.

As regards the prospects in South Carolina, it was estimated by Messrs. Henry W. Frost & Co., towards the end of September, that the crop of the islands as a whole 'may fall short of the last by 10 to 15 per cent.' It was added: 'The general opinion now is that the crop can, under no circumstances, equal the

last; but it is impossible at this date to predict what the final result will be.' Unless there are developments of an entirely unexpected character, it is probable that, with a total crop not appreciably larger than the last, prices will not be seriously affected and the best cotton produced in the West Indies may not improbably reach values only slightly, if at all, below those of last year.

There is another feature of the situation that deserves consideration and that is the steadily increasing consumption of Sea Island cotton by mills in the United States. It is evident that, year by year, the people in the States are using more Sea Island cotton for manufacturing purposes, and it follows that there must be a smaller quantity left for export to Lancashire and elsewhere. From statistics given in the *Annual Circular* just issued by Messrs. Henry W. Frost & Co., it is shown that the consumption of Sea Island cotton in the United States is larger than ever. During the year 1903-4 the northern and southern mills took 39,324 bales, while during the year 1904-5 they took 63,430 bales or an increase of 24,106 bales. This was equivalent to the whole of the increased production of Sea Island cotton during the crop of 1904-5.

It would not be wise to attach too much importance to these figures, but they confirm reports showing a tendency on the part of the United States to enlarge the use of Sea Island cotton, and should this continue the fine spinners in the United Kingdom and in Europe will have to look for other sources of supply than the Sea Islands for silky, long-staple cottons, which are necessary for the continuance of their special industry.

The British Cotton-growing Association is fully aware of the facts herein stated, and the Council has given public expression to the opinion that, should the supply of Sea Island cotton from the United States fail to come up to their requirements, they will have to look elsewhere, and preferably to British colonies, for the raw material hitherto obtained from South Carolina.

Owing to the action taken by the Imperial Department of Agriculture, planters in the West Indies have been placed in an exceptional position in regard to the development of the new industry. Every form of encouragement, consisting of good seed at low prices, the establishment of experiment plots, the services of travelling instructors and trained experts, the delivery of popular illustrated lectures, the free distribution of literature in the form of readable leaflets and

pamphlets, and the establishment of several central ginning factories, and, beyond all, the powerful assistance of the British Cotton-growing Association in finding a favourable market for the produce, has been given to growers, with the result that only in the third year of experimentation the exports of Sea Island cotton from the West Indies will probably amount to 1,000,000 lb. of the value of £50,000. The price obtained for West Indian Sea Island cotton, as compared with South Carolina Sea Island cotton, has been most satisfactory. During the last year the West Indian cotton sold at about 2d. to 3d. per lb. above the average price of good ordinary South Carolina cotton.

Allusion is made above to the practice of 'ratooning' cotton adopted by some of the less careful planters in these colonies. To ratoon Sea Island cotton is a suicidal policy. Those who adopt it and allow neglected fields of cotton to remain in close proximity to those newly planted not only injure their own interests but also spoil the prospects of their neighbours and threaten the success of the industry. In order that buyers on the other side should not be misled and the high character already acquired by West Indian cotton should not be lost, it is important that 'ratooned' cotton should be marked and shipped as such and kept entirely distinct from 'crop' cotton.

After all, the simplest and safest plan would be to abandon the practice of ratooning altogether and thus avoid all risk of injuring the industry.

RAT VIRUS IN DOMINICA.

In reference to the note in the last issue of the *Agricultural News* (p. 319), it may be of interest to publish the following notice that appeared in the *Dominica Official Gazette* of September 30:—

Recent trials of Liverpool rat virus in Dominica having shown good results in checking the depredations of rats in cacao fields, it is proposed that the virus be regularly imported by the Imperial Department of Agriculture according to the demands of planters for it.

In order that the virus may be placed in the hands of purchasers in a perfectly fresh condition, it is necessary for consignments to be brought from England on ice, and kept on ice after arrival until delivery to planters, when it should be used at once, care being taken not to expose it to light.

The cost of the virus is 2s. 6d. per small tube, and 8s. per large tube, with a small additional charge to cover freight, etc. The large tube contains six times as much virus as the small one. Full directions for applying the virus are given with each tube.

The Curator of the Botanic Station will undertake to forward orders for any virus, the cost of which may be prepaid, or will be happy to give full information to parties desiring to import for themselves.



SUGAR INDUSTRY.

Manuring Sugar-cane in Hawaii.

Bulletin No. 15 of the Experiment Stations of the Hawaiian Sugar Planters' Association contains the results of fertilizer experiments during the years 1897-1905, by Mr. C. F. Echert. The following is a condensed summary of the results of these tests:—

Lands capable of producing 11 tons of sugar to the acre without fertilization, may be fertilized with profit, climatic conditions and water supply being favourable.

While soils of high fertility may respond to mixed fertilizers, the percentage of gain is greater as the soils suffer a gradual exhaustion.

The Rose Bamboo and Lahaina varieties of cane did not show the same response to various combinations of fertilizer ingredients. It is indicated that Rose Bamboo requires a larger store of phosphoric acid to draw from than Lahaina for the best results. Lahaina cane responded more to an increased supply of potash in the soil than Rose Bamboo.

Both Rose Bamboo and Lahaina cane showed a considerable gain in yields from fertilization with nitrogen. The percentage of this element in the soil on which the tests were carried out was below the average for the islands.

On a soil containing phosphoric acid (soluble in a 1-per cent. solution of aspartic acid) in quantities which were in large excess of those contained in the average soil, phosphoric acid applied with nitrogen gave yields of Rose Bamboo cane exceeding those obtained when nitrogen was applied alone. Under the same conditions, Lahaina cane gave about the same yields following fertilization with nitrogen as when nitrogen was applied with phosphoric acid.

On a soil containing potash (soluble in a 1-per cent. solution of aspartic acid), in quantities comparing closely with those of the average island soil, Rose Bamboo and Lahaina cane gave increased yields when this element was applied with nitrogen.

The separate application of phosphoric acid in soluble forms to lands standing high in phosphoric acid may result in a loss of sugar rather than in a gain. It is indicated that the chances of loss are greater with Lahaina cane than with the Rose Bamboo variety in localities where the two varieties make an equally thrifty growth under normal conditions.

Separate applications of potash in the form of sulphate of potash may decrease the yields of cane. The danger of loss is apparently greater with Lahaina cane than with Rose Bamboo. This refers to applications of potassium sulphate to lands under cane.

The fact that the application of one particular element gives negative results with respect to fertilization does not warrant the assumption that the element in question may, with profit, be omitted as a component part of mixed fertilizers. Applied with another element, the gains may be considerably greater than could be obtained with the latter element alone.

With both varieties the purest and richest juice was obtained from the cane on the unfertilized area. In general, the plots receiving incomplete fertilizers yielded juices of greater purity than those plots to which the three elements were applied together.

Cultivation of Sugar in Mexico.

The following information in regard to the cultivation of sugar in the state of Vera Cruz in Mexico is extracted from the *U.S. Monthly Consular Reports* for July:—

The state of Vera Cruz has lately developed into an important sugar-producing territory. My report for the fiscal year 1900-1 states that 412 tons of sugar were exported from Vera Cruz in that year, the United States having taken almost the entire output. In 1903-4 every sugar estate in the republic was busily engaged in grinding, turning out mainly muscovado and centrifugal of 96°, for the English market. The estimate of the production of that year was 15,000 tons, while the estimate of the production in 1904-5 is 30,000 tons.

It is evident that the sugar industry of Mexico has attracted the attention of many persons, for inquiries are frequently received here for information concerning the industry, from the cost of land to the cost of production. I have therefore procured, so far as it lay in my power, what I consider trustworthy data on these points, and give them herewith.

Mexican statistics show that in 1904, 38,668 acres were planted in sugar-cane in the state of Vera Cruz.

The yield of sugar depends upon the location of the plantations. At the higher levels it is not so great as in the hot lands; 26 to 45 tons of cane per acre in the higher lands would be a fair production. The saccharine matter from this quantity of cane is 65 per cent. of the weight of the cane, and the quantity of white centrifugal sugar produced runs from 7½ to 10 per cent. or over—say, about 130 to 150 lb. of sugar per ton of cane.

For the purpose of giving information as complete as possible on the planting, cultivation, and cutting of cane, as well as on the results and yield of sugar and aguardiente, I submit the following reports from several well-established sugar estates in this consular district, all owned and managed by Mexicans well versed in the business:—

Plantation A.—The total number of acres owned by this company is 14,386, valued at \$2,700,000, of which 2,484 acres are planted with cane. The production during normal years is from 8,000 to 10,000 arrobas, or, say, from 200,000 to 250,000 lb. of cane per hectare (2·471 acres). The quantity of sugar produced is equal to about 9 per cent. of the weight of the cane, and the estate has a capacity of 7,500 tons of sugar for the season, which is put on board cars at a cost of 2c. per lb.

Plantation B.—This estate has an area of 1,912·5 acres, of which 714 acres are rented. An area of 714 acres is planted with cane and produces 62 tons of cane per hectare (2·471 acres). The quantity of sugar produced is 225 lb. from every 2,500 lb. of cane, and 70 litres (18½ gals.) of aguardiente of 30° from every 2,575 lb. of cane. The total yearly production of sugar is 175 tons and aguardiente, of 30°, 11,690 barrels of 70 litres (18½ gals.) each. The total cost of production of the sugar put down at Vera Cruz is 63¼c. for 25 lb. There are no other products than those mentioned.

Plantation C.—This estate has an area of 4,336·6 acres, which are valued at \$30,000. Of the total acreage, 1,255·5 acres are planted with cane, and an equal area is utilized as pasture land. The annual production of cane amounts to 75 tons per hectare (2·471 acres), and the yield of sugar 10 per cent. of the cane. The total annual production of sugar is 3,750 tons.



WEST INDIAN FRUIT.

DATE GROWING IN THE UNITED STATES.

Full particulars were published in the *West Indian Bulletin* (Vol. V, pp. 143-5) of the experimental cultivation of the date palm in the United States. The following note from the *Yearbook* of the U. S. Department of Agriculture for 1904 contains recent information as to the progress of these experiments:—

Encouraging results have been secured in the establishment of this industry in the south-western portion of the United States. The date orchard at Tempe, Arizona, is progressing in a highly satisfactory way. The work here has been carried on in co-operation with the Arizona Experiment Station and has been under the direct supervision of Professor R. H. Forbes. In co-operation with the California Experiment Station, work on the establishment of date culture in southern California is also being conducted. Ten acres of land have been secured for an experimental orchard, and dates have been and are being planted there. The industry has been further encouraged by the publication of important reports on the subject, pointing out available localities where the crop is likely to succeed. There is a considerable extent of territory in southern California where practically all of the dates of a certain class which are now imported could, in all probability, be grown. These regions have been mapped, and a special effort has been made to encourage the production of the crop therein. Various importations of the date have been made during the year and others will follow from time to time as the industry advances.

FUNGOID DISEASES OF THE BANANA.

The cultivation of the banana is now receiving considerable attention in several of the West India Islands. It is an industry that has increased by leaps and bounds during the last few years and shows considerable promise for the future.

So far, disease has not shown itself among bananas in any alarming proportions, but a few notes on those diseases produced by fungoid pests may be interesting to growers.

In Trinidad a disease caused by *Marasmius semiustus* (a fungus closely related to that causing the root disease of sugar-cane) has been a prominent feature. This fungus looks like a small mushroom, having a yellowish-brown pileus, $\frac{1}{2}$ inch across, and appears on the stem of the banana plant. The mycelium permeates the tissues and attacks the flower-stalk. It only seems to be prevalent on plants where they

are grown in unsuitable or impoverished soils, or where the constitution of the growing plants has been weakened by other causes. This disease is also known to occur in Jamaica, but the planters there do not think it is likely to do any damage under the circumstances obtaining in ordinary cultivation (see *West Indian Bulletin*, Vol. III, p. 166).

Another disease of bananas in Jamaica was reported by Professor F. S. Earle as the banana leaf blight. It causes the browning of the vascular bundles in the veins and mid-rib of the leaves. This is soon followed by the blackening of the entire leaf-blade, and eventually by the rotting of the leaf and petiole. It does not seem able to extend from the petiole into the tissue of the stem, the terminal bud continuing to push out fresh leaves. Infected plants are much stunted in growth and do not generally bear fruit. Apparently it is due to a bacterial parasite and may prove troublesome, unless all diseased plants are immediately destroyed (see *West Indian Bulletin*, Vol. IV, p. 6). In the Annual Report of the Porto Rico Agricultural Experiment Station for 1904, mention is made of two diseases of bananas which are prevalent there.

One is due to fungus belonging to the *Sphaeropsidae*, which causes minute clustered dots, beginning on the under side and extending through the upper surface, associated with a yellowing of the surrounding area. This attack usually precedes a gradual wilting of all the leaves of the plant, but may continue for months in an immature state.

The other is a rot, probably of bacterial origin, which does considerable injury to bananas fertilized with nitrogenous manures. Streaks of brownish tissue indicate the course of the disease from the root-stock to the top of the stem.

Although these diseases do not seem to have caused any anxiety at present, yet it cannot be urged upon planters too strongly that they should always be on the lookout for any disease amongst their plants, and that, when any become infected, steps should immediately be taken to prevent the spread of the disease. This can usually be done by either cutting down affected plants or by the judicious use of fungicides.

Trinidad's Motto. A correspondent writes to ask us for the meaning of the motto of the colony of Trinidad, 'Misericordie probat populos et foedera jungi.' Roughly translated, it is 'He approves the mingling of the nations and linking by treaty bonds.' The line in Virgil, of which the motto is a corruption, runs 'Misericordie probet populos aut foedera jungi.' The speaker is Venus, who is uncertain whether Jove would approve of the union of the Trojans and Didos people. (*West India Committee Circular*.)

CONFERENCE OF BANANA GROWERS AT BARBADOS.

A large and representative gathering of banana growers met at Barbados on Friday, October 13, for the purpose of discussing the present situation in regard to the banana industry.

In opening the conference, the Imperial Commissioner of Agriculture stated that the industry had been started on very modest lines. In the year 1902 they shipped 18 bunches of bananas; in 1903 they shipped 6,691 bunches; in 1904 they shipped 15,326 bunches, and already, up to the 5th. instant, they had shipped 28,018 bunches. It was not unlikely that they would ship about 40,000 bunches of bananas during 1905, which would be a very good record for practically the third year of operations. By the last mail they shipped 2,700 bunches. That was the largest single shipment yet made.

He considered the position of the industry was a very promising one, provided attention were devoted to the following points, viz., (1) that local shippers continued to select good, large bunches of bananas, cut them at the right time, and were very careful in packing them, so that they should arrive in Bridgetown in first-class order; (2) that the Royal Mail Company did their best to assist the industry. Without the hearty co-operation of the mail company it would be impossible for the industry, not only to be carried on, but even to exist at all, because there were other people coming into the field, who were likely to be very keen competitors with local shippers in the space available on board the Royal Mail steamers. Trinidad, British Guiana, and St. Vincent were all proposing to ship fruit.

The Royal Mail Company, on his (Sir Daniel's) suggestion, had installed the Hall system of cold storage in the 'Tagus' and 'Trent.' That system had proved an entire success. Recently the 'Orinoco' had also been fitted with a cold-storage chamber, which, though not quite as large as those in the 'Tagus' and 'Trent,' was yet capable of holding 2,500 to 3,000 bunches of bananas.

If the industry developed sufficiently, however, the company was prepared to fit cargo ships with cold-storage chambers and make them regular fruit ships. That was a development that would likely come on earlier now than before, on account of the starting of a new fruit company in Trinidad, called the British West Indian Fruit Company, Limited, in which the Royal Mail Company had a considerable interest. Operations had already been started in Trinidad and very soon that colony would be exporting bananas on a large scale. They would export bananas naked—not in crates—and consequently would not compete with Barbados, except as regards space. By undertaking to fit up their ships with cold-storage chambers, the Royal Mail Company had nursed the industry in its early stages. In fact, the chambers were primarily intended for carrying Barbados fruit. It was understood, however, that the company could not reserve space for Barbados banana growers, unless the latter were prepared to fill that space.

The question, then, to be decided was: What could they do to ensure that the Royal Mail ships would not come to Barbados filled, so that the local shippers could not get the accommodation they had hitherto been accustomed to? In order to ensure sufficient space, it was necessary for them to give the company notice, beforehand, of the amount of space required, which would, of course, have to be paid for whether used or not.

There were several people in England who were anxious to be agents for the fruit from Barbados, but Messrs. W. Pink & Sons had practically brought the trade into its present proportions and they deserved support. The time would come when the Barbados banana growers would have to make some arrangements to sell their fruit locally. They might deliver the fruit in Bridgetown, get paid for it according to the quality of the fruit, and then leave the matter of shipment entirely in the hands of the purchasers of the fruit. That was the only practical course to be pursued. There were two companies that were likely to make proposals in that direction.

He hoped that Mr. Skinner, the Managing Director of the British West Indian Fruit Company, and Mr. A. F. Clark, of Jamaica, who had been appointed Manager, would visit Barbados to study the conditions and make definite proposals to the planters with regard to carrying on the industry.

It would be for the local growers to decide whether they would enter into a contract with the company and sell their fruit for a certain price all the year round, or whether they would ask a fixed price during the six months when the trade was slack and a higher price during the other six months. He thought that if they obtained for their bananas a price which would net them, after paying all expenses, 1s. 3d. to 1s. 9d. per bunch, that would probably be as reasonable a price as they could hope for.

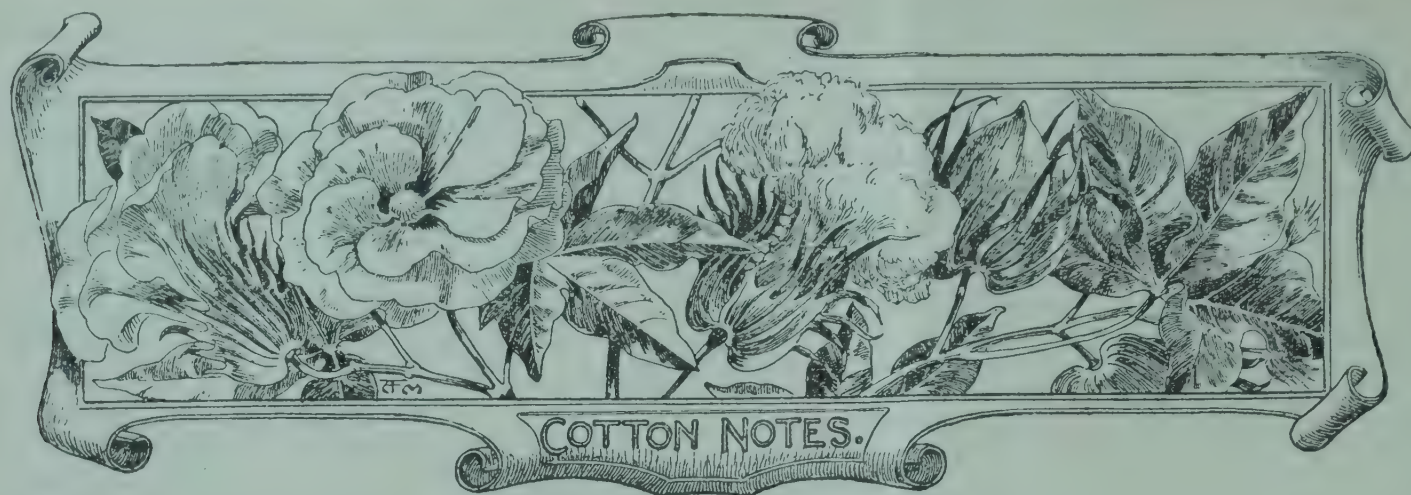
Sir Daniel Morris stated that he had that morning received a letter from Mr. Owen Philipps, Chairman of the Royal Mail Company, in which the latter stated that he would be sailing from New York on the 'Tagus' on the 18th. instant and would be passing through Barbados on November 12, when he hoped he might have the pleasure of seeing him (Sir Daniel) to discuss questions in connexion with the fruit trade, in which they were mutually interested. He suggested that a small committee be appointed as a deputation to wait on the Chairman of the Royal Mail Company and put their case before him.

Mr. J. R. Bovell stated, with reference to the 15,326 bunches of bananas shipped last year, that those who shipped single bunches received 2s. 5³/₄d. per bunch on the average, while those who shipped in double crates received 2s. 3⁵/₈d. The reason was that during four months last year the losses were very heavy. He had returns from certain shippers, one of whom gave the average cost of shipping as 11d., another put down his at 1s., another at 1s. 1¹/₂d., and one at 1s. 2d. Those figures included the cost of growing, packing, bringing the bananas to town, and everything else.

After further discussion, Mr. S. S. Robinson expressed the opinion that bananas would pay in Barbados, but what prevented many growers from planting on a large scale was the uncertainty of the transport.

On the motion of Mr. Bovell, seconded by Mr. W. D. Shepherd, the following gentlemen were appointed a deputation to wait on the Chairman of the Royal Mail Company on November 12 next, and present their case before him with the view of obtaining an assurance that their fruit would have a fair chance of being accepted for shipment by the company:—The Hon. F. J. Clarke, the Hon. G. L. Pile, the Hon. Richard Haynes, Messrs. A. P. Haynes, E. A. Hinkson, J. R. Bovell, G. P. Skeete, E. L. Hollinsed, S. S. Robinson, G. Elliott Sealy, and E. E. H. Thorne.

A vote of thanks to Sir Daniel Morris, moved by the Hon. F. J. Clarke, and seconded by Mr. Robinson, brought the meeting to a close.



COTTON CULTIVATION IN THE DUTCH WEST INDIAN COLONIES.

In a report on cotton cultivation in Dutch colonies, published in the *U. S. Monthly Consular Reports* for June, the following reference is made to the experiments being carried on in the West Indian Colonies of Holland:—

As to the colonies of Surinam and Curaçao, the prospects of a resumption of the cultivation of cotton are given in Bulletin No. 2 of the agricultural inspection district of the West Indies. This bulletin shows that on the island of St. Eustatius experiments, which may be said to have been satisfactory, were made with various sorts of cotton. On St. Martin, with the assistance of the Government, plantings have been made which showed immediately that the cultivation of cotton there was practicable. In 1904 the Government advanced to a private individual in St. Martin a sum of \$600 for that purpose. No report has yet been received in regard to an experiment on a small scale in the district of Nickerie, in Surinam, in 1904.

WEATHER CONDITIONS AND COTTON GROWING.

Experience in cotton growing in the West Indies has shown that the yield is influenced more by rainfall than by the artificial manuring of the soil. It has, however, been pointed out that this applies to lands that have borne but one or two crops of cotton, and that, in the case of lands growing cotton continually, attention would have to be paid to the manurial requirements of the plant. Considering, therefore, that so much depends upon the climatic conditions to which the cotton crop is subjected, it may be of interest to review briefly an important paper in the *Yearbook* of the U. S. Department of Agriculture for 1904 on the 'Relation of Weather Conditions to Growth and Development of Cotton.' It must, however, be clearly understood, that the following notes contain the experience of growers of Upland cotton in the United States. The conditions under which Sea Island cotton is grown in the West Indies are necessarily very different, but these notes may serve as a basis for similar observations in these islands.

During the planting season there must be frequent but comparatively light showers to keep the soil in a moist condition, favourable for germination. Should the soil become dry and baked, the seeds will not obtain the required nourishment and but few plants will come up.

If the first three months have been favourable, with plenty of sunshine and only sufficient rain to furnish

nourishment to the plant, cotton can stand plenty of rain for the next four or five weeks. But an excess of rain after this causes the plants to make rank growth, while it is next to impossible to keep the fields free from weeds and grass.

During the blossoming period it is best that there should be no more than the normal amount of rain. When the petals fall off and the small boll is left, little rain and plenty of sunshine are required. If there is too much rain during the fruiting season, the results are disastrous, new flowers ceasing to be produced, and the small bolls falling off.

During the picking season dry weather is needed. Only sufficient moisture is required to nourish the growing bolls and opening flowers.

ST. VINCENT COTTON FACTORY.

The Agricultural Superintendent has forwarded the following report on the work of the Central Cotton Factory, St. Vincent, for the period January 1 to September 23, 1905:—

The factory was opened on January 1, but owing to certain minor defects in the oil engine, work was not carried on regularly until January 16, and then it was found that the power generated was only sufficient to drive steadily three gins. Work was carried on with the three gins until February 24, when it was decided to purchase at a cost of £300, the steam engine and boiler that were worked so successfully during the previous season. On March 14 work was re-started with the steam engine with complete success, six gins and the disintegrator being driven with a full load.

It should be mentioned that the disintegrator for crushing cotton seed for feeding to stock and manure, was installed at the same time as the steam engine by Mr. J. J. Law, of Barbados.

An effort was made last season to form a company to take over and work the factory, but without success; so that, as last season, the factory was worked under the control of the Agricultural Department. Mr. Alex. Fraser again acted as Manager, with a fresh overseer—Mr. Ivan Stephens. Both officers, I am glad to report, gave satisfaction.

Work under this head was completed on June 30, and from January 1, 281,606 lb. of seed-cotton were sent for ginning, which gave 77,814 lb. of lint and 199,941 lb. of seed. The percentage weight of lint to weight of seed-cotton worked out at 27.6 per cent. The 77,814 lb. of lint mentioned above, were made up into 233 bales, the larger number of which were made to contain 360 lb. net., as it was pointed out that buyers preferred purchasing lint put up in bales of a uniform weight. No bales were shipped by the factory during the period, the owners shipping direct to the British Cotton-growing Association.

Only 4,204 lb. of seed were sent to be disintegrated, which gave 4,114 lb. of crushed seed. The total receipts for ginning and baling cotton and disintegrating cotton seed amounted to £325 19s. The working expenses were £320 14s. 9d., leaving a small credit balance of £5 4s. 3d.

Considering the delays which occurred during the period of working, and the low price charged for ginning and baling, this result may be regarded as satisfactory. Then again, the large sum of £83 6s. 4d. is included in working expenses for bale bags, 415 of the 750 received being on hand and in good order.

SELECTION AND DISINFECTION OF COTTON SEED FOR PLANTING PURPOSES.

Owing to the high price obtained—1s. 5d. per lb.—for the best local-grown cotton, and as it was not possible to obtain a further supply of seed for planting purposes from the Sea Islands, the local growers decided, on the advice of the Imperial Department of Agriculture, to plant seed obtained from the best marks of local-grown cotton. The seed required was sent to the factory and selected and disinfected at cost price. This work was commenced on April 13 and finished on September 23.

Besides the seed dealt with for local growers, large orders were received from officers of the Department in other West India Islands. These orders were dealt with during the same period. The amount of seed treated for local growers was 15,387 lb., which gave 11,860 lb. * of selected and disinfected seed. The proportion of selected to unselected seed was therefore 77·07 per cent. For export and local sale 16,717 lb. of unselected seed were purchased from local growers whose cotton was especially good and had realized 1s. 5d. to 1s. 6d. per lb. This seed after selection and disinfection gave 13,990 lb., the bulk of which was exported.

The working expenses incurred in selecting, disinfecting, and exporting all of the seed dealt with amounted to £136 15s. 7d. Of this amount £80 6s. 5d. was expended on the purchase and selection of seed for export, packing and shipping charges. The actual cost of selection and disinfection only was 95c., or 3s. 11½d. per 100 lb. of seed. This is therefore the rate charged local growers.

The price charged for seed sold and exported from the factory was 2½d. per lb. This included all charges to destination.

To date a few accounts are unpaid, but when paid there will be a credit balance of £31 15s. 10d. This is therefore the profit on the seed sold and exported.

GUANGO OR RAIN TREE.

The *Monthly Weather Review* of the U. S. Department of Agriculture contains the following interesting note on the guango or saman or rain tree (*Pithecolobium Saman*), a native of tropical America, in reference to its effect on climatic conditions:—

Mr. Fred Turner, F.L.S., communicates to the *Daily Telegraph*, Sydney, N.S.W., of May 27, a short article on the rain tree or guango in Australia. He says that during the past thirty years few trees have received more attention than this from both scientific and practical men. At one time and another, writers have recommended its extensive cultivation in the drier parts of the world in order to provide moisture and make the desert blossom as the rose. Its botanical name is *Pithecolobium Saman*, Benth.; it is

indigenous to Brazil and Central America, but is now raised successfully in many other regions, and is a beautiful, umbrageous tree of remarkably quick growth. Mr. Turner states that he has raised more than 300 seedlings in the Botanic Gardens of Brisbane, Queensland. As the latitude of Brisbane is about 27° 30' S., on the north-east coast of Australia, it would seem, at first thought, as though this tree would flourish in the analogous climates that we have on the south-east coast of the United States, especially the coasts of Georgia, Florida, and Texas, but Mr. David Fairchild, of the Bureau of Plant Industry, states that several experiments at introduction have not met with decided success. Turner states that he has planted the guango in various soils and situations and they made remarkable growth during the summer months, especially after the January rains, but the leaves fell off at the approach of the winter and the plants died down to within 2 inches of the ground. Southern Queensland was too cold, but Northern Queensland, corresponding to our Florida, was fairly well adapted. The fruit consists of four to eight seeds, embedded in a saccharine pulpy matter very pleasant to the taste; the mature seed-pods are largely used as feed for stock. They are about a ¼ inch thick, and from 6 to 10 inches long.

Of course the readers of the *Review* do not need to be told that trees will not provide moisture or bring rain, but, on the one hand, such trees as the guango may be helpful in draining wet lands, and, on the other hand, the cool moist air settling down from their leaves during the night-time may provide a local condition that will make it possible for certain plants to grow in their neighbourhood, that would otherwise be killed by the heat and the dry air.

COLONIAL EXHIBITION AWARDS.

The *West India Committee Circular* of September 29 contains a list of further awards made for rums and spirits at the Colonial Exhibition. It is gratifying to note that a Grand Prize was awarded to the Government Laboratory, Jamaica, for the best collection of well-made, high-flavoured rums. The list of awards may be summarized as follows:—

BARBADOS.	TRINIDAD.
4 Gold Medals.	2 Gold Medals.
3 Silver Medals.	3 Silver Medals.
4 Bronze Medals.	4 Bronze Medals.
JAMAICA.	
1 Grand Prize.	
1 Gold Medal.	
4 Silver Medals.	
8 Bronze Medals.	

The following is an extract from an article in the *St. Vincent Sentry* of September 29:—

We are very pleased to note that, although the colony of St. Vincent occupied no special court at the Exhibition, the enterprising proprietor of 'Three Rivers' arrowroot did not miss the opportunity of advertising that excellent product of this island at the Crystal Palace. Mr. Porter's enterprise has been crowned with success, he having been awarded a silver medal for his exhibit. As the success of his efforts to stimulate the demand for 'Three Rivers' arrowroot means increased trade for St. Vincent, we wish the business continued progress.

* 200 lb. transferred to export account.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The prospects of the Sea Island cotton industry in the West Indies are fully discussed in this issue's editorial. The position of the industry is entirely satisfactory and provided ratooning be abandoned there is a promise of good prices in the future.

A summarized report of an important conference of banana growers, held at Barbados on October 13, will be found on p. 325. It was evident from the remarks of speakers that banana growing offers remunerative returns, if satisfactory arrangements can be entered into for shipping the fruit to the United Kingdom.

Among notes of interest to cotton growers (see pp. 326-7) is a report on the working of the Central Cotton Factory at St. Vincent.

It is desired to draw the attention of banana growers and others in Barbados to the offer of special prizes at the forthcoming Agricultural Show for banana fibre (see p. 329).

An illustrated note on the 'Success' knapsack sprayer appears on p. 230; also a note on spraying cattle for ticks.

Bird lovers and others who devote attention to the natural history of these islands should read with interest the article on p. 333 on the protection of birds in Dominica.

Agricultural News.

Beginning with the next issue of the *Agricultural News*, a change in the day of issue will be rendered necessary by the alteration in the sailings of the Royal Mail steamers.

While the *Agricultural News* will be published as heretofore, on every alternate Saturday, it will be ready for distribution on the preceding Wednesday, in time for the intercolonial mails. Copies for England will go by the mail steamer leaving Barbados the day after the date of publication.

The next issue (No. 93) will therefore be published on Saturday, November 11, instead of on Saturday, November 4, but will be ready for distribution on the preceding Wednesday, viz., November 8.

Medals for Cotton Growers.

In a recent letter to the Imperial Commissioner of Agriculture, Sir Alfred Jones, K.C.M.G., has notified his willingness to present gold and silver medals to the growers of the best cotton in the West Indies.

Sir Daniel Morris has suggested that the medals be offered for competition at the Agricultural Shows that are to be held, under the auspices of the Imperial Department of Agriculture, towards the end of 1905 and in the early part of 1906, in Barbados, St. Vincent, St. Kitt's-Nevis, Antigua, Montserrat, and the Virgin Islands; also that medals be offered to Jamaica, Tobago, and Carriacou.

It is believed that Sir Alfred's idea will assist in encouraging the devotion of attention to cotton growing on right lines. In order that the medals may be fully appreciated, it is suggested that they be awarded only in case of exceptional merit and that, with this aim in view, the authorities in charge of the medals be instructed to withhold them for another year, if the exhibits are not fully worthy of them.

Birds of Dominica.

In connexion with the article on p. 333 on the protection of birds in Dominica, it may be mentioned that Mr. A. Hyatt Verrill has just published, under the title of 'Additions to the Avifauna of Dominica,' notes on the birds of the island. The paper contains notes on species hitherto unrecorded with descriptions of three new species and a list of all birds now known to occur in Dominica.

Mr. Verrill states that the list and notes are compiled from his own observations and collections made during twenty months' stay in the island.

The three new species described in this paper are: 'Bell's Humming-bird, (*Thalurania Belli*), named after his Honour the Administrator; 'Riviere's Hawk,' (*Buteo rivierei*); and the 'Tropical Redstart' (*Septophaga tropica*).

Mr. Verrill is of opinion that the list of species occurring in Dominica is still far from complete. There are portions of the island, not yet visited by collectors, which may well contain species unknown to the island fauna.

Cultivated Sorghums.

In reference to species of *Sorghum* usually cultivated in the West Indies, it has been suggested to adopt the following names in order to secure uniformity of nomenclature, viz. :—

Guinea Corn (*Andropogon Sorghum*, var. *vulgaris*).

Imphee or Sugar Sorghum (*Andropogon Sorghum*, var. *saccharatus*).

Broom Corn (*Andropogon Sorghum*, var. *technicus*).

Banana Fibre.

In order to ascertain whether the fibre contained in the stem of the bananas grown at Barbados possesses a commercial value, the Imperial Commissioner of Agriculture is prepared to offer prizes at the Show, to be held at Harrison College in December next, for the best samples of clean, dry banana fibre; not less than 3 feet in length and not less than 10 lb. in weight. Each sample is to be accompanied by particulars of the cost per cwt. of production and delivery in Bridgetown.

Many attempts have been made in Jamaica and elsewhere to utilize the fibre contained in the banana plant, but so far without success. As the plant grown at Barbados (*Musa Cavendishii*) differs from that grown at Jamaica, it is regarded as worth while to make a special investigation into its merits and submit specimens to well-known firms in the United States and Europe for valuation and report.

At first the specimens will have to be prepared by hand, but later, if there are reasonable prospects of a good market for the fibre, it is possible that a simple and portable machine may be devised for the purpose.

It is suggested that the fibre be extracted only from stems that have already borne fruit and are therefore of no value except to be cut up and turned into manure.

To prepare the fibre a portion of what is usually called the stem (made up of leaf-sheaths) should be divided lengthways into convenient narrow strips, about 3 feet long. The outer and coarser layers with stained fibres should be rejected.

Each of the narrow strips should first of all be beaten with a mallet or round club until the fibres are rendered soft and pliable. They should then be scraped with a blunt knife or strip of bamboo and washed until all the pulp is removed and there is nothing left but white, glistening fibres. After being dried in the sun each bundle of fibres should be arranged lengthways, one above another, so as to make a large, neat bundle of straight fibres, all of the same length.

Agriculture in Carriacou.

In the course of a couple of interesting articles in the *Grenada Chronicle* on a visit to Carriacou, Mr. W. Malins Smith states that the future prosperity of this dependency is now assured. Speaking of the character of the soil, he mentions the case of a field of common cotton, growing on untilled soil with fairly vigorous growth. Judging from the appearance of the fruit trees of the island, the depth of soil appears to be

very satisfactory. In most places the soil is black, medium loam of good mechanical condition.

The dryness of the soil is to be attributed, not to an insufficient rainfall, but to causes, such as the absence of wind-breaks and lack of tillage, which may be easily controlled by the people.

Carriacou is wonderfully free from insect pests; scale insects and blight are not to be seen, nor are the cotton fields troubled by the cotton worm or other pests.

Corn and cotton are the staple agricultural products. Sea Island cotton flourishes with little care beyond tillage, and there is no doubt that the people would benefit by replacing their Marie Galante cotton with the long-staple Sea Island. One grower has already planted 100 acres with it.

There are signs that some of the peasants are realizing that other crops than corn and cotton can be grown in Carriacou. There are small patches of bearing cacao to the cultivation of which several valleys on the leeward side are well suited. Cocoa-nuts and the Chinese banana are also being planted.

The island has always been noted for its live stock. Some of the larger proprietors have big flocks of sheep, the manure of which, sold to the Grenada cacao planters, is a considerable source of revenue.

Castor Oil Industry.

In an article in the *Yearbook* of the U. S. Department of Agriculture for 1904 it is stated that in the United States the use of this oil is on a small scale compared with the increased consumption of other expressed oils, such as cotton seed and linseed.

The functions which castor oil performs in industry and the arts are of great economic importance. Within comparatively recent years an extensive demand has sprung up for it in connexion with dyeing and printing cotton goods, as in certain processes it enjoys a practical monopoly. Probably the next most important channel of consumption is in the drug trade, although it no longer commands the same universal demand as a 'home remedy.' Castor oil has also an extensive use for illuminating and lubricating purposes in some countries. It is adapted to use in the dressing of leathers, while it is also used for making 'sticky fly-paper' and the so-called glycerine soap.

The equipment of a castor oil factory is almost identical with that of a cotton seed meal factory. Two grades of oil are placed on the market. The No. 1 grade commands the highest price and enters into medicinal uses, the other supplies various industrial needs. The industry yields also a by-product of commercial value. This is the oil cake, or 'castor pomace' as it is called. Containing, as it does, the whole of the poisonous properties of the castor bean, this by-product cannot be used as a food-stuff. It is, however, well adapted to manurial uses, being especially rich in nitrogen.

Beans of good quality contain about 45 per cent. of oil, but 32 per cent. is an average amount. The rather high proportion of 13 per cent. remains after expression.



INSECT NOTES.

The Success Knapsack Sprayer.

The 'Success' is a very popular form of knapsack sprayer, and quite a number are in use in the West Indies. It consists of a copper tank, of 5 gallons capacity, pump and agitator, and is furnished with discharge hose and nozzle. It is carried on the back and held in place by straps going over the shoulders, thus leaving the hands free to pump and to direct the spray.

The 'Success' sprayer is so arranged that either hand may be used for pumping while being carried, or the pump lever may be taken off and a handle attached to the top of the pump and used as a bucket sprayer. This form of

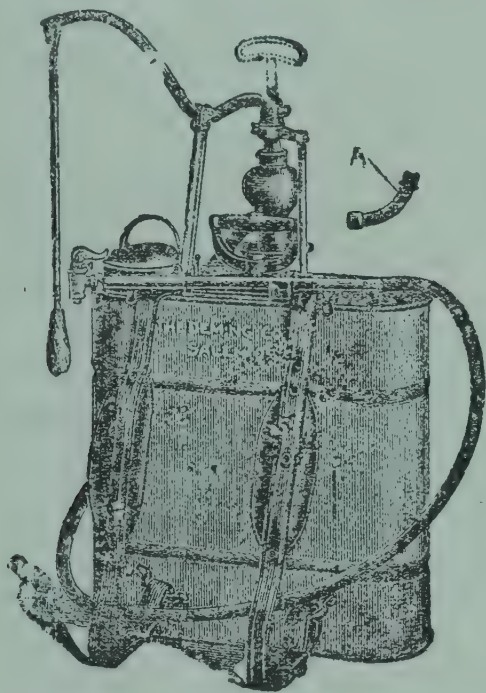


FIG. 23. THE SUCCESS KNAPSACK SPRAYER.

sprayer differs from the Auto-spray (see *Agricultural News*, Vol. IV, p. 186) in that pumping is continuous during the spraying operation.

The 'Success' knapsack sprayer will be found very useful in spraying garden plants, small orchard trees, and for general use in all places inaccessible for barrel sprayers, such as those described on p. 234 of this volume of the *Agricultural News*.

By means of a nozzle extension, made of a piece of gas-pipe, 6 or 8 feet in length, trees 10 or 12 feet in height could easily be sprayed with this machine.

Fig. 23 shows a knapsack sprayer and bucket sprayer combined with a 5-gallon copper tank to hold the liquid which is applied in a mist-like spray. The dotted line shows the handle used in pumping when the lever is taken off and the instrument is used as a bucket sprayer.

The 'Success' knapsack sprayer is useful for applying both insecticides and fungicides. For spraying with Paris green or kerosene emulsion the Vermorel type of nozzle should be used, while for Bordeaux mixture the special Bordeaux nozzle would be better. The automatic agitator is a special feature of this apparatus.

Spraying Cattle for Ticks.

A large amount of work has been done in Cape Colony on the control of cattle ticks especially those concerned in communicating such serious diseases as Heartwater, Red-water and African coast fever. The dipping of infested cattle in tanks especially constructed for the purpose has been strongly recommended and practised on a large scale. At the present time, however, spraying is being advocated by certain cattle owners who claim it to be preferable to dipping. The materials used for dipping are arsenical solutions, which sometimes have an injurious effect on the cattle treated. The spraying is done with a mechanical mixture of kerosene and water. It is claimed by the advocates of spraying that it is cheaper in its initial cost and in its application than dipping, and that it is more efficacious in killing the ticks and never injures the cattle.

No serious diseases are common in these islands which are spread by the agency of cattle ticks, the West Indian ticks injuring cattle merely by their habit of feeding on them, and few planters care to go to the expense of building a costly dipping tank for the sake of controlling these ticks; but spraying might be resorted to, as the initial cost for pump and hose is small.

A discussion on the relative merits of the two methods is now going on in the *Agricultural Journal* of the Cape of Good Hope, in which the respective advocates state results at some length; it will be of interest in the West Indies to know what conclusions are reached. Up to the present time the Government Entomologist and the Government Veterinarian continue to recommend dipping.

TROPICAL PRODUCTS IN THE UNITED STATES.

The following figures, abstracted from the *Year-book* of the U.S. Department of Agriculture for 1904, show the amounts and values of the imports of certain tropical products into the United States during the year 1903-4:—

Article.	1903.		1904.	
	Quantity.	Value.	Quantity.	Value.
Bees'-wax lb.	488,576	\$ 127,220	425,168	\$ 116,878
Honey Gals.	287,696	115,400	206,292	69,053
Cacao and chocolate lb.	65,046,884	8,257,441	75,070,746	9,600,604
Coffee „	915,086,380	59,200,746	995,043,284	69,551,799
Bananas		8,541,156		7,709,976
Oranges lb.	56,872,070	818,780	35,893,260	525,468
Ginger, preserved or pickled lb.	569,292	23,810	230,890	13,502
Cocoa-nuts		908,242		971,852
Spices lb.	51,201,179	4,815,125	43,274,396	4,366,008
Molasses Gals.	17,240,399	1,124,710	18,828,530	1,018,198
Sugars lb.	4,216,108,106	72,088,973	3,700,623,613	71,915,753
Tobacco lb.	34,016,956	17,234,915	31,162,636	16,939,487
Vanilla beans lb.	521,689	1,032,654	550,328	1,424,647
Onions bushels.	925,599	699,657	1,171,242	914,413



ST. LUCIA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND EXPERIMENT PLOTS, 1904-5.

Botanic Station.—The total expenditure on the Botanic Station and the Experiment Plots in the country districts was £761 7s. 1d. The sum of £58 17s. 2d. was derived from the sale of plants, etc.

The rainfall for the year 1904 was 77.72 inches. This is 9.12 inches below last year's return, and less than the average for fifteen years by 17.65 inches.

Various improvements have been effected in the appearance of the station by the addition of many interesting plants. Residents and visitors continue to find the station an attractive resort.

Economic plants are distributed from the Botanic Station and also from the Agricultural School and the Rivière Dorée station, and it is satisfactory to observe that the total number (34,995) of plants distributed by the Department shows considerable increase over last year's distribution.

Taking into consideration the various changes in the staff during the year and the dry season, the report on the work done at the station appears to be satisfactory.

Agricultural School.—The total expenditure on the school amounted to £718 5s. 11d.

The average number of boys at the school was twenty. Progress has been maintained in the indoor work. The marks obtained by the boys at the two half-yearly examinations were, on the whole, satisfactory. The boys are reported to have taken an interest in their gardens, where excellent vegetables are produced.

In connexion with the experiment plots at the school interest attaches to the experiments in cotton growing. It is shown that, in a normal season, good results can be obtained with Sea Island cotton. Full details are given as to the experiment with this variety and the local Upland variety. Other experiments with economic plants were carried out, and the statement of the results is of considerable interest.

The live stock at the school include woolless sheep, Belgian hares, and bees. Special attention is devoted to instruction in bee keeping.

Experiment Plots.—Mr. Hudson reports on the cacao experiment plots at Soufrière, Dennery, and Roseau, and the cotton plots at Micoud, Dennery, Vieuxfort, Gros Islet, Soufrière, Rivière Dorée, and Castries.

It is gratifying to observe that several estates are now carrying on their own experiments and are following those methods whose value has been so well demonstrated in the Department's plots. Cotton experiments were continued at eight different points scattered over the island.

The remarks of Mr. Hudson in reference to various matters connected with the cultivation of cacao and cotton, as well as of pine-apples, limes, vanilla, etc., are full of interest. The observations should be of considerable value in directing attention to some of the more pressing problems that need to be solved at the present time.

HORSE BEAN AS GREEN DRESSING.

Seeds of a leguminous plant known as the horse bean (*Canavalia ensiformis*), received from Mr. John Belling, B.Sc., Agricultural and Science Master at St. Kitt's, were recently forwarded for trial at the various West Indian Botanic Stations. The following notes on the growth of this plant at Grenada have been received from Mr. R. D. Anstead, B.A., the Agricultural Superintendent:—

On June 19, fifty-two seeds were sown 5 feet by 5 feet. These germinated well and made bushy plants, which grew very rapidly, and by the middle of August were 2 feet high with a spread of about 4 feet, and bearing a number of shortly stalked, pink flowers, in long racemes. These were followed by an abundance of broad pods, 9 inches to 1 foot long. On the 7th. of the present month, the plot was turned in as a green dressing for corn, and is being compared with woolly pyrol.

The plant appears to be well suited to this climate, a very quick grower, and it was entirely unattacked by any pests. Four plants have been preserved for seed, and I shall have the honour of informing you when it is ripe.

It may be mentioned that this plant was one of thirty leguminous plants grown under similar conditions in Barbados in 1900. In this experiment, the results of which are given in the Report on Agricultural Work for 1900, the horse bean came out seventh on the list, giving a total weight of 8,010 lb. (vines and roots) per acre. The analysis shows that this was made up as follows:—

	Pounds per acre.		
	Vines.	Roots.	Total.
Nitrogen	56.30	2.14	58.44
Phosphoric anhydride	12.09	0.94	13.03
Potash	28.08	0.98	29.06

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture will leave Barbados on Monday, October 23, in S. S. 'Serrana' on a visit to Grenada and St. Vincent. It is expected that Sir Daniel Morris will return to Barbados in S. S. 'Orinoco' on Sunday, October 29.

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations, left Barbados in S. S. 'Sibun' on Monday, October 9, for Antigua. Mr. Thornton will probably spend some time in the Leeward Islands visiting the cotton fields and assisting the planters in increasing the value of the industry by skilful methods of cultivation and prompt attention to insect and other pests.

The Secretary of State for the Colonies has appointed Mr. C. Somers Taylor, B.A., of Emmanuel College, Cambridge, Assistant Chemist at the Government Laboratory under the Island Professor of Chemistry, in connexion with Sugar-cane Experiments at Barbados, in succession to Mr. R. D. Anstead, B.A.



GLEANINGS.

During the fortnight ended September 21, 33 bales of West Indian cotton were imported into the United Kingdom. (*West India Committee Circular.*)

Mr. A. F. Clark, of Jamaica, has been appointed manager in Trinidad of the British West Indian Fruit Co., Limited. Mr. Clark arrived in Trinidad on October 4.

By the R.M.S. 'Trent' on October 4 there were shipped from Trinidad for England by the British West Indian Fruit Co., 709 crates of limes, 23 crates of oranges, 250 crates of bananas, and 3 cases of papaws. (*Port-of-Spain Gazette.*)

It would be desirable if those sending samples of cotton to the Imperial Department of Agriculture for examination would always send seed-cotton and not less than 8 oz. in weight.

Examination of ratoon cotton grown at Barbados has shown that it is generally poor, being of short staple and containing a very large proportion of unripe fibres. Such cotton is likely to prove very wasteful in the spinning factory.

The amount of sugar imported into the United States from the British West Indies and British Guiana in 1904 was less by 100,568 tons than in the previous year. The value decreased from \$6,469,204 to \$2,521,096.

According to the *Yearbook* of the United States Department of Agriculture, the total crop of Sea Island cotton for 1903-4 was 76,709 bales, of 378.7 lb. each, of the total value of \$599,694,724

According to the 'Annual Statement of the American Cotton Crop,' issued by the Liverpool Cotton Association, September 19, 1905, the total Sea Island crop for 1904-5 was 99,663 bales, made up as follows: Florida, 37,873; Georgia, 49,696; and South Carolina, 12,094 bales.

The Curator of the Botanic Station at Tobago writes that a long yam is sold in the island as 'Guinea' yam. It is the earliest of the varieties grown there, being the first to come into bearing. It is not, however, so long a yam as that bearing the same name on the West Coast of Africa.

It is stated in the *Consular Report* on Marseilles that the oil nut industry has been much disturbed by the scarcity of ground nuts. The Indian crop was very short, while the African ground nuts suffered much in quality owing to rain, and their oil was of an inferior quality. The output of oil cakes was therefore small.

All the Castilloa rubber trees at the St. Lucia Botanic Station are now large enough to be tapped. Tapping experiments are being carried out.

The next exhibition for school gardens and small proprietors at Tobago will take place on November 15. Instruction has been given at most of the school gardens, the majority of which are in good order.

A Canadian Information Bureau has been started at Barbados under the guidance of Mr. J. A. Elder, of Messrs. Ramsey Elder & Co., who will supply information relating to the lands, manufactures, etc., of the Dominion.

According to the *U.S. Monthly Consular Reports* for June, the discovery of a method of extracting citric acid directly from the waste of lemons is attracting considerable attention in Sicily. In a recent experiment fifty-four boxes of Sicilian lemon waste were used.

According to the Annual Report of the Inspector of Schools in Trinidad, 190 schools were examined in practical agriculture during the year 1904-5; of these fifty-four obtained the highest award. In the previous year, of the 180 schools examined only thirty obtained the highest award.

The *Demerara Argosy* states that Dr. Bovallius, who has been actively exploiting the rubber industry of British Guiana, has now begun to ship rubber to London and hopes to send consignments every month. He is instructing the Patamona Indians how to tap the rubber trees and expresses himself as thoroughly satisfied with the quality of the rubber.

A handy little volume, called the 'Globe Trotters' Dictionary,' containing a large number of common words likely to be used by travellers, in six different languages, has been issued by the Nitrate of Soda Propaganda. The Director writes that he will be glad to send copies to those interested in agriculture.

It may be of interest to state that Hugh Browne, of whose success as a cotton grower mention was made in the *Agricultural News* (Vol. IV, p. 294), was a member of the St. Lucia-St. Vincent cricket team which visited Barbados recently. The *St. Lucia Voice* states: 'He is only nineteen and conducted himself in a manner most creditable to himself and the Agricultural School at St. Vincent, wherein he has spent four years.'

On the islands and coast of Carolina caterpillars have been general, but by the free use of poison they have been kept in check and have caused but little injury. The reports, however, continue unfavourable, owing to rust and shedding. As these setbacks to the crop are not usual at this period of the season, with favourable weather conditions, the crop may not fall much short of the last. (Report of Messrs. H. W. Frost & Co., September 9, 1905.)

The United States Commercial Agent at St. Kitt's has reported to his Government on the cotton industry in the British West Indies. He says the industry in St. Kitt's-Nevis has now reached the point where it produces a steady and regular income, for which much credit is due to the Imperial Department of Agriculture. 'It is now recognized that West Indian Sea Island cotton is an article in good demand, and the industry shows every promise of being established on remunerative lines.'

PROTECTION OF BIRDS.

Under the title of 'Protect our Birds and benefit the Planters,' the *Leeward Islands Free Press* (Dominica, September 30) has the following article:—

It is deeply to be regretted that the agriculturists of Dominica and other West India Islands have not yet awakened to the immense benefit or detriment which the protection or destruction of birds renders their crops. In a tropical island of small area the influence of the birds in checking the ravages of injurious insects is far greater than in the north for various reasons. Whereas in the tropics insects breed and flourish throughout the year, thus increasing at a remarkable rate, in colder climates many are destroyed by the rigours of winter. In addition, the set-back they receive during that season in northern climates necessitates a comparatively long period in which to recover vitality and increase sufficiently to prove injurious in the early spring, at which season vegetation is most readily and seriously injured by them. In the second place, insects are notably scarce in the heavy forests which cover such a large portion of Dominica, and insectivorous birds are therefore compelled to seek a livelihood in the open, and on cultivated land.

As the number of birds in Dominica is proportionately very large, as compared with the area of the island, the birds render far greater service than in other localities. This very abundance in the vicinity of villages and plantations renders their destruction more easy, and for that very reason stringent laws should be enacted and enforced protecting the native birds.

Many people are under the impression that only insectivorous birds are beneficial, but this is far from being the case. Such species as the Grassquits, locally known as 'Zee-zee-zeb' are exceedingly beneficial, as they feed almost exclusively upon the seeds of grasses and weeds and do much to check the spread and increase of these nuisances.

Other species such as the Grosbeak, Perenoir, etc., are principally fruit eaters and destroy far more than they actually require for food. Although, as a general rule, it is unwise to upset the balance of nature in any way, such harmful species should be unprotected, and the planter or fruit grower should be at liberty to destroy them whenever caught injuring his crops, unless their destructive character is more than off-set by their song or plumage.

Certain other species such as the local Cuckoo or 'Cuckoo-mioc,' which for some unknown reason is not protected, should be encouraged in every way, for unlike its European cousin, the native Cuckoo does not lay its eggs in the nests of other birds or destroy their eggs or young, but renders an enormous service by its insatiable appetite for cockroaches, caterpillars, and other injurious and undesirable insects.

Even the common 'Malfine' does far more good than harm, for although it may occasionally vary its diet with young fowl, its principal food consists of mice and rats, while it is always ready to pounce upon locusts, caterpillars, or grasshoppers. A study of the stomach contents of this much-maligned bird will at once convince any one of the truth of this statement—a fact that has long been recognized in the United States, where the subject of proper bird-protection has been deeply studied, with the result that nearly all hawks and owls are now rigorously protected there.

The present game laws of Dominica are exceedingly primitive and behind the times, and a law that permits the slaughter of such valuable and charming songsters as the Grive, Grosgrive, etc., even during a few months of the year, should be immediately repealed.

Even the 'Pipiree,' than which there is no greater insect enemy, is wantonly killed by the natives and used as food, although the amount of meat on its meagre body is almost nil.

Much more damage to the birds is done by the common practice of snaring and trapping by boys than by actual shooting. I have seen as many as fifty 'Sucriers' and 'Zee-zee-zeb' captured by a couple of boys in a single day, only to be played with and tortured for a few hours and then cast aside, crippled and dying.

Such offences should be severely dealt with, and the mere possession of snares, traps, or birds in captivity should be made

an offence. Although the number of strictly Dominica birds, or birds which occur on the island throughout the year, is comparatively small, numbering only about fifty species, yet large numbers of migratory species arrive from the American continent in the fall, and many of these remain throughout the winter months.

Coming, as they do, at a season when insects are very numerous and with a craving hunger born of their long flight across the sea, they ravenously devour every insect they see and in a few days destroy more than the native species do in months. On one occasion a flock of American Redstarts, locally known as 'Chats,' visited the garden of Dr. Nicholls in Roseau where they remained for a whole day, and during that time entirely destroyed a scale blight which was then infesting the Rubiaceae plants.

Such foreign invasions are to be heartily welcomed by the Dominicans, and every effort should be made to render the stay of the feathered invaders pleasant and provide them with a safe refuge. Birds are very quick to appreciate a spot where they are protected, and will invariably visit such localities to the exclusion of others less favourable to their welfare.

This fact is well illustrated in Bermuda, where immense numbers of immigrants arrive annually, although far out of the usual course of bird migration.

In certain private lands in Florida and other southern states also, the immigrants arrive and spend the winter; whereas neighbouring lands in the vicinity are almost deserted by them.

If the Dominicans must shoot game of some sort on the island, can they not be satisfied with Ramier and Perdrix among the birds?

Even the Parrots and Ciceroos should be guarded zealously, ere they, like the Diablotin, are exterminated and the Dominicans find too late that they can no longer boast that their island is the home of the largest parrot in the world.

The following list will serve to aid the planter in protecting birds which will benefit him and his crops:—

<i>Beneficial.</i>		
Crabier	Malfine	Cuckoomioc
Owl	Hirondelle	Pipiree
Gobmouche	Chewech	Titine
Pia-pia	Chat	Trembler
Perrovanter	Mauvais	Rossingol
Zee-zee-zeb	Grive	Grosgrive

La belle Grostete, Cheweck tetelong, Siffleur Montagne.

<i>Injurious.</i>		
Small Hawks	Perenoir	Meresang.
	Grosbeak	

<i>Harmless but not particularly beneficial.</i>		
Sea birds	Ramier	Tourterelle
Humming-birds	Perdrix	Ortolan
Kingfishers	Gaulins	Becasse
Parrot	Ciceroo	Perich
	Sucrier	

WEST INDIAN AGRICULTURAL CONFERENCE, 1906.

The Barbados *Advocate* of October 11 has the following note in reference to the proposal to hold the next West Indian Agricultural Conference in Jamaica:—

It would be a decided misfortune if the 1906 Agricultural Conference is not held in Jamaica, for, apart from the results usually expected to flow from such a meeting, the delegates from the various colonies would be afforded some idea of what the tourist trade in Jamaica means and the measures taken to provide for it; and they would be in a position to report to their various Governments and to persons interested, on the advisability of taking steps to turn the tide in these directions and to provide better facilities for tourists than are now afforded.

IMPORT DUTIES ON FRESH TROPICAL FRUIT.

Downing Street,
September 15, 1905.

Sir,—I am directed by Mr. Secretary Lyttelton to transmit to you, for your information and for publication, the accompanying copy of a statement prepared by the Board of Trade, showing the import duties leviable on fresh tropical fruits in Russia, Norway, Sweden, Denmark, Germany, Holland, Belgium, and France.

I am, etc.,
(Sgd.) C. P. LUCAS.

The Imperial Commissioner
of Agriculture for the
West Indies.

Statement showing the import duties leviable on fresh tropical fruits in Russia, Norway, Sweden, Denmark, Germany, Holland, Belgium, and France.

KINDS OF FRUIT.	RATE OF DUTY.	ENGLISH EQUIVALENT.
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Russia.

	Roub. Cop.	£ s. d.
Grapes ... Poud. g.r. wt. 3 60	Cwt. qr. wt. 1 3 8	
Oranges, lemons, bitter oranges...	1 57½	10 4
All other fresh fruit	0 90*	5 11

Norway.

	Kron. Ore.	£ s. d.
Oranges of all kinds, citrons, lemons, bitter oranges ... Kilog. 0 02	Cwt. 1 1½	
Grapes ... Kilog. 0 02	Cwt. 1 1½	
Bananas ... Kilog. 0 05	Cwt. 2 10	
Pine-apples ... Kilog. 0 20	Cwt. 11 3½	
Other tropical fruits, fresh ... Kilog. 0 15	Cwt. 8 6	

Sweden.

	Kron. Ore.	£ s. d.
Grapes ... Kilog. 0 50	Cwt. 1 8 3	
Oranges, lemons, and other tropical fruits, fresh ... Kilog. 0 10	Cwt. 5 7½	

Denmark.

	Kron. Ore.	£ s. d.
Oranges of all kinds ... Pund. 0 03½	Cwt. 3 6½	
Grapes ... Pund. 0 14½	Cwt. 16 5½	
Other tropical fruits, fresh ... Pund. 0 00½	Cwt. 0 7	

Germany.

1. Duties at present in force.

	Mks. pfg.	Free.
Fresh grapes :		
Table grapes :		
Sent by post in packages of 5 kilogs. qr. wt. or less ...	Free.	Free.

	Mks. pfg.	£ s. d.
Other table grapes 100 kilogs. 4 00	...	2 0½
Other fresh grapes, not crushed ... 10 00	...	5 1
Oranges, citrons, lemons, bitter oranges, pomegranates ... 4 00	...	2 0½
Bananas ... Free.	...	Free.
Pine-apples
Other southern fruits, fresh ... 12 00	Cwt.	6 1

2. Duties from March 1, 1906.

Fresh grapes as above.		
Oranges ... 3 25	...	1 7½
Lemons ... Free.	...	Free.
Cedrats, bitter oranges, pomegranates ... 2 00	...	1 0½
Bananas ... Free.	...	Free.
Pine-apples ... 4 00	...	2 0½
Mangos, dates ... 12 00	...	6 1
Southern fruits, fresh ... 2 00	...	1 0½

Holland.

	Fls. cts.	£ s. d.
Figs ... 100 kilogs. 1 00	...	10½
Other tropical fruits, fresh ... 5% ad valorem.	5% ad valorem.	

Belgium.

	Frs. cts.	£ s. d.
Lemons, oranges, figs ... 100 kilogs. 9 00	Cwt. 3 7½	
Pine-apples, ... 30 00	...	12 2
Grapes not crushed ... 30 00	...	12 2
Other fruits, fresh : Imported in boxes, baskets, or other packages of a wt. of 3 kilogs. or less ... 30 00	...	12 2
Imported otherwise ... 12 00	...	4 10½

France.

	Frs. cts.	£ s. d.
Table fruits, fresh : Lemons, oranges, cedrats, etc., ... 100 kilogs. 5 00**	Cwt. gr. 2 0½	
Mandarin oranges, ... net. 10 00	net. 4 0½	
Hot-house grapes and fruits ... net. 0 00	net. 3 1 0	
Common table grapes ... net. 8 00	net. 3 3	
Ordinary wine grapes, residue of grapes ... net. 12 00	net. 4 10½	
Other fresh fruits ... gr. 3 60	gr. 1 2½	

* This duty will be doubled after March 1 next.

** Oranges of European origin, imported from a country other than the country of production, are subject to a surtax of 3 frs. 60 cts. per 100 kilogs. (1s. 5½d. per cwt.).

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following review, dated September 11, 1905, of the position of West Indian products on the Canadian market:—

The wholesale trade report good inquiry for fall business. The fruit and wheat harvests have fully realized the expectations and are being rapidly reaped without any appearance of early frosts.

THE SUGAR PREFERENTIAL TARIFF.

The action of the refiners in altering their conditions of purchase has been brought to the notice of the Dominion Government, and the subject will be dealt with at the meetings of the Tariff Revision Committee during the next few months. The general feeling, however, is that it is entirely a question of business, buyers failing to see why they should pay more for the sugar than it will obtain in other markets.

SUGAR.

Business remains very quiet. There are three cargoes afloat, two of cane sugar from Java and Demerara and one cargo of beet from Europe. Centrifugals 96° have been slow to move, and offers of spot sugars are made at an exceedingly low figure, even at a lower parity than import prices. Prices must be considered purely nominal. Muscovado 89° are without buyers.

MOLASSES.

Normal conditions exist, and a steady trade continues to be done by wholesale houses. A small lot of 400 puncheons of Barbados arrived early this week by sailing vessel on consignment, having been shipped for Newfoundland, Montreal option.

COCOA-NUTS.

A slow market exists; the only supplies wanted being for desiccators, and they are well supplied

SPICES.

Nutmegs continue steady at better rates. Pimento—buyers of new crop hold off owing to advance at ports of origin. Ginger—small stocks and better inquiry.

MINERAL SPRINGS OF JAMAICA.

The following notes on the mineral springs of Jamaica are extracted from *Jamaica in 1905*:—

There are many mineral springs in Jamaica, most of them possessing valuable qualities for the cure of various diseases and infirmities of the body. Two of these are particularly famed, namely, the hot sulphurous spring at Bath, and the warm salt spring at Milk River. There are public institutions maintained at both these springs for the benefit of those requiring relief.

The spring at Bath, in the parish of St. Thomas, is believed to be the hottest in the island; the temperature at the fountain head is 126° to 128° F., but the water loses about 9 degrees of heat in the transit to the bath. These waters are sulphuric and contain a large proportion of hydro-sulphate of lime; they are not purgative, and are beneficial in gout, rheumatism, gravelly complaints, cutaneous affections, and fevers.

The bath at Milk River, in the district of Vere, is one of the most remarkable in the world. It is a warm, saline, purgative bath; the temperature is 92° F. It is particularly efficacious in the cure of gout, rheumatism, paralysis, and neuralgia; also in cases of disordered liver and spleen. Some wonderful results are on record.

The Spa Spring, or Jamaica Spa, as it is called, at Silver Hill, in St. Andrew, was formerly maintained as a government institution, and extensive buildings once existed there, but they are long gone to decay and the spring is neglected. These waters are chalybeate, aerated, cold, tonic; beneficial in most cases of debility, particularly after fever, in dropsy and stomach complaints.

Another similar spring, but not so strong as chalybeate, exists at St. Faith, in the district of St. John.

There are also springs throughout the island:—at Moffat on the White River, a tributary of the Negro River in the Blue Mountain Valley; near the source of the Cabaritta River in Hanover; at Windsor, near St. Ann's Bay; at Garbrand Hall, on the east branch of the Morant River; on the Adam's River, near the Blue Mountain Ridge, in the parish of St. Thomas; at Port Henderson in St. Catherine; on the sea edge of Manatee Bay, in St. Catherine; at Rock Fort, near Kingston; and in many localities salt-water springs are found, and some impregnated with soda or other alkalies.

The following table shows the principal constituents of the waters of the Jamaica mineral springs:—

	Milk River.	Jamaica Spa, Silver Hill.	St. Thomas.	Manatee Bay.
One pint contains:	92° F. Savory & Moore.	63° F. Bow- rey.	130° F. Bow- rey.	
Chloride of potassium ...	1.44	...	0.04	...
Chloride of magnesium...	37.08	...	...	4.34
Chloride of sodium ...	186.93	125	1.48	52.52
Chloride of calcium ...	13.50	...	...	1.31
Carbonate of lime ...	...	...	...	2.71
Carbonate of soda ...	...	...	0.21	...
Sulphate of soda ...	27.93	341	0.79	...
Sulphate of magnesia ...	...	1.745	...	...
Sulphate of lime ...	...	1.234	0.62	...
Sulphate of iron ...	...	.833	...	...
Sulphate of alumina ...	...	1.360	...	...
Silica ...	...	.883	...	...
Silicate of soda ...	...	...	0.45	...

Products of the Congo Free State. First and most important of all the Congo country's productions are ivory and rubber, of which experts say there is a sufficient store with which to supply the markets of the world for a length of time that need not cause anxiety to present generations. Besides this, the country produces nearly all the staple tropical products in a wild state. During the last twenty years the Belgians have directed their efforts with considerable success to the cultivation of native cotton, sugar-cane, tobacco, coffee, and cacao. American cotton, within the last three years, has been planted, and the result of this experiment, which promises well, is awaited with great interest. (*U.S. Consular Reports.*)

MARKET REPORTS.

London,—September 29, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 22, 1905; and 'THE PUBLIC LEDGER,' September 23, 1905.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 21/- to 60/- per cwt.
ARROWROOT—St. Vincent, 1½d. to 1¾d. per lb.
BALATA—Sheet, 1/6 to 1/11; block, 1/5 per lb.
BEES'-WAX—£7 10s. to £8 2s. 6d. per cwt.
CACAO—Trinidad, 53/- to 60/- per cwt.; Grenada, 48/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.

COTTON—West Indian, medium fine, 6.20d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 5/6 per bunch.

GRAPE FRUIT—12/- to 13/6 per box.

LIMES—4/6 to 6/- per box.

ORANGES—Jamaica, 14/- to 20/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, low middling, 42/6 to 44/- per cwt.

HONEY—16/- to 24/- per cwt.

ISINGLASS—West Indian lump, 2/- to 2/5; cake, 1/3 to 1/4 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/1 per gallon; concentrated, £18 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/7 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Good pale, 1/7; pale and reddish, 1/3 to 1/4; fair red, 1/1 to 1/2; broken, 1/- to 1/1 per lb.

NITRATE OF SODA—Agricultural, £10 15s. per ton.

NUTMEGS—69's to 73's, 1s.; 89's, 8d.; 102's, 7d.; 117's, to 127's, 6d.; and in shell at 4¾d. per lb.

PIMENTO—2½d. to 2½d. per lb.

RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 17/- per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 12/- to 15/- per cwt.

SULPHATE OF AMMONIA—£12 12s. 6d. per ton.

Montreal,—September 11, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$23.00 to \$25.00; Trinidad, \$20.00 to \$21.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—Jamaica \$5.50 per barrel, duty paid.

PIMENTO—Jamaica, 5¼c. per lb.

SUGAR—Grey crystals, 96°, \$2.25 to \$2.40 per 100 lb.

—Muscovados, 89°, \$1.75 to \$1.90 per 100 lb.

—Molasses, 89°, \$1.50 to \$1.65 per 100 lb.

—Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—September 29, 1905.—Messrs. GILLESPIE BROS. & Co.

BEES'-WAX—30½c. to 31c. per lb.

CACAO—Caracas, 11½c. to 12c.; Grenada, 11c. to 11¼c.;

Trinidad, 11c. to 11¾c.; Jamaica, 9½c. to 9¾c. per lb.

COCOA-NUTS—Jamaica, \$26.00 to \$28.00; Trinidad, \$28.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8¾c.

GINGER—Jamaica, 7½c. to 9½c. per lb.

GOAT SKINS—Jamaica, 56c.; St. Kitt's dry, 49c. to 50c.; St. Kitt's dry-salted, 40c. to 42c. per lb.

GRAPE FRUIT—\$6.00 to \$8.00 per barrel; \$2.75 to \$5.00 per box.

HONEY—Jamaica, 63c. to 64c. per gallon (duty paid).

LIMES—Dominica, \$6.00 to \$8.00 per barrel.

MACE—28c. to 31c. per lb.

NUTMEGS—West Indian, 80's, 21c. to 22c.; 90's, 15c. to 16c.; 110's, 13½c.; 120's to 130's, 10c. to 11c. per lb.

ORANGES—West Indian, \$4.25 to \$5.50 per barrel.

PIMENTO—5c. per lb.

PINE-APPLES—3c. to 8c. each.

SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 2½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—October 9, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.50 per 100 lb.

CACAO—\$10.50 to \$11.00 per 100 lb.

COCOA-NUTS—\$9.25 to \$14.00 per M. for husked nuts; \$8.50 for nuts in husks.

COFFEE—\$10.50 to \$11.00 per 100 lb.

HAY—95c. to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$3.00 to \$3.25 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1.41 to \$2.00 per 160 lb.

RICE—Ballam, \$4.20 to \$4.75 per bag (190 lb.); Patna, \$2.86 to \$3.20; Seeta, \$3.26; Rangoon, \$2.50 to \$2.55 per 100 lb.

British Guiana,—October 2, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 14c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—Creole, 14c. per lb.

DHAL—\$3.90 per bag of 168 lb.

EDDOES—\$1.00 per barrel.

ONIONS—Madeira, \$2.70 per 100 lb., ex ship.

PLANTAINS—16c. to 24c. per bunch.

POTATOS, ENGLISH—\$3.00 to \$3.25 per barrel.

POTATOS, SWEET—Barbados, 90c. per bag.

RICE—Ballam, \$4.40 to \$4.50 per 177 lb.; Creole, \$4.30 to \$4.40 per bag. (ex store).

SPLIT PEAS—\$5.80 to \$5.90 per bag (210 lb.).

TANNIAS—\$1.92 per barrel.

YAMS—White, \$2.16; Buck, \$2.00 per bag.

SUGAR—Dark crystals, \$2.05 to \$2.10; Yellow, \$3.00 to \$3.10; White, \$4.00 to \$4.10; Molasses, \$2.00 to \$2.10 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—October 3, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.50; estates, \$11.50 to \$12.00 per fanega (110 lb.); Venezuelan, \$11.25 to \$11.90 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—67c. per Imperial gallon (casks included).

COPRA—\$2.90 to \$3.00 per 100 lb.

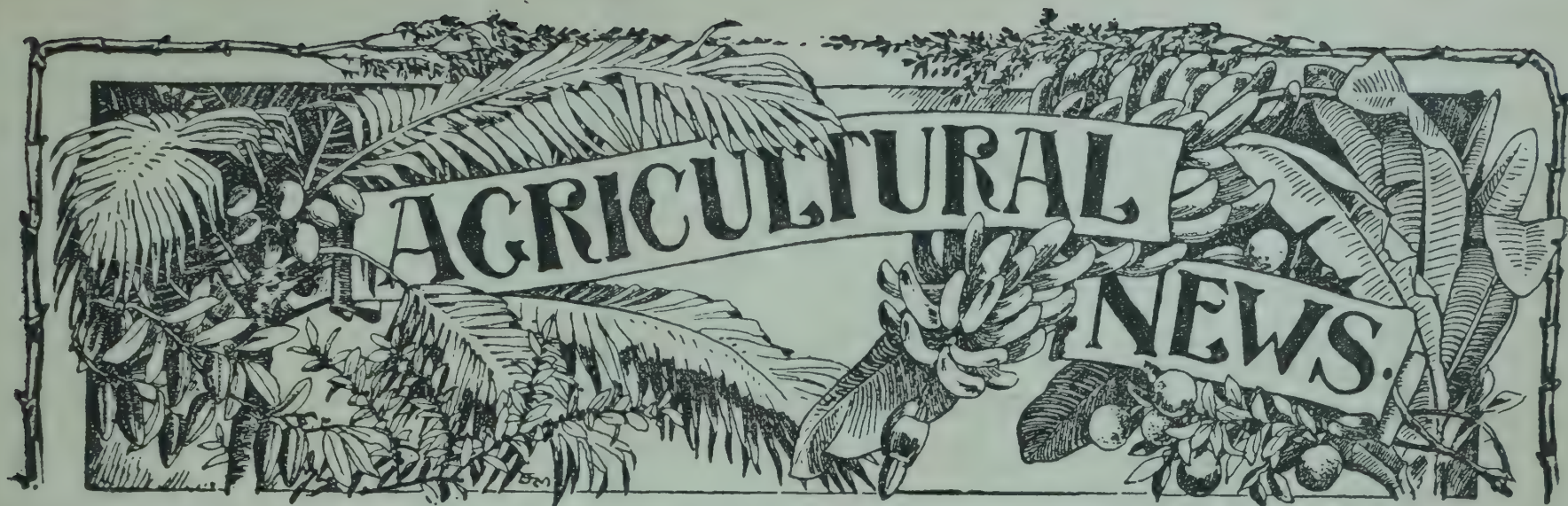
ONIONS—Stringed, \$2.00 to \$2.25 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.00 to \$2.15 per 100 lb.

RICE—Yellow, \$4.25 to \$4.60; White, \$4.80 to \$5.75 per bag.

SPLIT PEAS—\$5.20 per bag.

SUGAR—White crystals, \$4.00 to \$4.50; Yellow crystals, \$3.00; Molasses sugars, \$2.50 to \$3.00 per 100 lb.



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tunity for reviewing briefly the work that has been carried on by the Imperial Department of Agriculture in St. Lucia during the last two years.

The appearance of the Botanic Station has been further improved during the year 1904-5 by the addition of a large number of interesting plants. Bare and shady spots are gradually being converted into attractive rockeries. The station is very popular with the residents of Castries, as also with the many visitors from abroad. The nursery has been kept well stocked with economic plants, 9,104 being distributed during the year. Plants were also distributed from the nurseries at the Agricultural School and the Rivière Dorée Station, which brought the total number of plants distributed by the Department in St. Lucia to 34,995, a considerable increase over last year's distribution.

The Officer-in-charge of the Agricultural School (where twenty-five resident pupils are regularly trained in the practical details of agriculture) reports that progress was maintained in the indoor work and that the pupils took an increased interest in their individual gardens and also in the technical work that is carried on at the Experiment Station. In the experiment plots a large variety of crops was cultivated. The experiments in cotton growing demonstrated that, in a normal season, good results can be obtained with the Sea Island variety. The yield of seed-cotton from the plot, $\frac{1}{2}$ acre in extent, planted early in June, was 482 lb., or at the rate of 247 lb. of lint per acre. The results of late planting were unsatisfactory, only 90 $\frac{1}{2}$ lb. of seed-cotton being reaped from the $\frac{1}{2}$ -acre plot.

Agriculture in St. Lucia.

THE issue, recently, of the Annual Reports on the Botanic Station, Agricultural School, Experiment Station, and Experiment Plots in St. Lucia for the year 1904-5 affords a suitable oppor-

Efforts are now being made in St. Lucia to encourage the cultivation of the Chinese banana. Preparations are being made at the school to cultivate this banana with the view of making experimental shipments and of increasing the number of plants available for distribution. In previous trials strong suckers planted in June produced eight- and nine-hand bunches in April and May of the following year. This would appear to be a very suitable cultivation for St. Lucia, as it is hoped that adequate shipping facilities can be secured by means of the Royal Mail steamers.

Woolless sheep, Belgian hares, and bees are being successfully maintained at the school. Pupils are instructed in the best methods of bee keeping, and arrangements are being made to extend the apiary so that each boy can have a hive to himself.

The report of the Agricultural Instructor shows that three cacao plots were in operation, and seven cotton plots. The Soufrière cacao plot has shown steady increases in yield since it was taken over in the year 1900-1. The other cacao plots, owing, apparently, to deficient rainfall, have not given as good returns as in the previous year. As showing the beneficial effect of these plots, it may be mentioned that the Agricultural Instructor reports that several estates now have their own experiment plots and are adopting the methods that have been demonstrated in the Department's plots to be successful.

The results of the experiments in cotton growing, which have been carried on at eight different points scattered over the island, were not, owing to the abnormal season, altogether conclusive. They indicate, however, that Sea Island cotton can be successfully grown in St. Lucia. The cultivation expenses in the first year are somewhat higher in St. Lucia than in some of the other islands, but in the second year the returns are likely to be satisfactory.

In spite of what has been done by the Department and by the Agricultural Society, which provided the funds for working the plots in the country districts, the prospects of a cotton industry at St. Lucia are not encouraging. Success can only be obtained by the larger planters taking up the cultivation of Sea Island cotton, which variety alone offers remunerative returns. There are districts in St. Lucia where, if the soil were well cultivated and the worm promptly dealt with, Sea Island cotton could do as well as in any part of the West Indies.

In his report, Mr. Hudson discusses many points of vital interest to cacao planters. Interesting observa-

tions are made upon such questions as the use of leguminous plants for green dressing, shade trees and wind-breaks, and other problems which require to be solved at the present time, to which end much useful work can be contributed by the planters themselves.

An interesting minor industry of much promise is the keeping of bees. Mr. Hudson has devoted much attention to this and has met with considerable success. In 1902 there were only seventy colonies of bees in the island; at the time of writing he was able to report 400 colonies, nearly all of which are worked for extracted honey. In 1904 about 4 tons of honey were exported in addition to local sales.

It may be added that the St. Lucia Agricultural Society has encouraged the establishment of school gardens. During the year £5 was devoted to prizes. Such encouragement is likely to have a useful effect in aiding this important branch of agricultural education.

SUGAR INDUSTRY.

Improvement in Sugar-cane.

In a paper on 'Improvement in Plants,' read before an agricultural conference held in Queensland in May last, Mr. Edward Grimley, Secretary of the Queensland Acclimatization Society, made the following allusion to work in connexion with the improvement of the sugar-cane:—

In British Guiana, in 1904, the acreage of seedling sugar-canes was 1,882 and the increase of sugar per acre was 31 per cent. over the acreage grown under Bourbon, the standard variety. It may not be out of place here to mention that one of the seedling canes imported by the Queensland Acclimatization Society, named B. 208, and since distributed, has given exceptionally good returns. We have now a report from Messrs. Gibson, of Bingera, which gives a return of 69 tons 6 cwt. of cane to the acre, with 22.2 per cent. of sucrose and Brix. 23.9, or 21.45 per cent. of possible obtainable cane sugar, or over 14 tons to the acre. These results were obtained under irrigation, and the experimental plot was well manured. The average yield in Queensland per acre for the last seven years was 13.16 tons, so that B. 208 gave more sugar per acre than the average tons of canes per acre in Queensland.

Sufficient is said to show that an advance is being made; at all events, enough to show that in time we shall get a 20-per cent. cane with fair weight to the acre. Such a cane would drive beet sugar out of cultivation, unless protected by high duties.

Mr. James Mitchell, the overseer of the Queensland Acclimatization Society, has lately given attention to the hybridization of sugar-canes, and claims that he has a few hybridized plants from which he expects great results. The society I represent can fairly claim, with the Colonial Sugar Refining Company, to be in the front rank in Australia in trying to improve sugar-cane.

Seedling Cane D. 74 in Louisiana.

The following extract in reference to the successful cultivation of the West Indian seedling cane D. 74 in Louisiana is extracted from the *Sugar Planters' Journal* of October 7:—

The very general favour with which seedling cane D. 74 has met all over the state may help to solve the problem of a cane-cutting machine. This cane stands erect, defies the storms and winds, and the grinding season finds it free from prostrate and crooked canes. The more optimistic planters are predicting the time when the cane will no longer be stripped or cut by hand.

This, however, is not the feature of D. 74 which renders it popular. It has stood on its merits as a sugar producer. The present season will find many sugar mills making sugar from this cane. But little of it was ground the past season. Most of the crop was planted. Everything at present indicates that the introduction of this cane by Dr. Stubbs and its distribution from the experiment stations will prove to be an epoch-making event in the history of sugar making in Louisiana.

Progress in the West Indies.

The following is extracted from the *International Sugar Journal* for October:—

Mr. Robert Harvey, M.I.M.E., of Glasgow, recently penned a letter to the *Glasgow Herald*, in which he showed that the West Indies are certainly realizing the necessity of getting more modern sugar machinery, and that they show a decided preference for British plant. He wrote:—

I was much interested in reading your London letter in your issue of Friday, September 1, with regard to the West Indies and the prospects of prosperity for these islands. I agree with the writer that the old-time planter is now becoming a thing of the past in the West Indies, and the younger men now in the business are adopting more up-to-date methods both as regards the cultivation of the land for sugar-cane, and as to the method and the machinery that should be used in turning the same into marketable sugar. I beg, however, to differ from your correspondent regarding the English sugar engineers being behindhand in adopting new methods in the manufacture of sugar and sugar machinery. It may be something new to your correspondent to know that even with the superior yield of the land in the Hawaiian Islands, and with all the improvements in American sugar machinery, sugar is at present made in the West Indies as cheaply as in the Sandwich Islands.

Furthermore, as steam ploughs and irrigation are now being introduced into the West Indies, the cost of making sugar will be still further reduced.

The extra large yield of canes per acre mentioned by your correspondent in the Sandwich Islands is, as he states, by ploughing, draining, and irrigation, but this at great expense. In fact, the estates are handicapped there by irrigation machinery at enormous expense; and over and above this, the cost of the upkeep of drains and working them is about £5 per acre per annum, which has to be reckoned with in arriving at the cost of their canes per ton, and the American ton is 2,000 lb. against our English ton of 2,240 lb.

The first consideration in the making of cheap sugar is the cost of producing the canes. The lower the rate at which this can be done, the cheaper the sugar, and by the use of the steam ploughs, and irrigation, the weight of canes

per acre should be about double what it is at present with hand labour in the West Indies.

Your correspondent states in his letter that the ingrained conservatism of the British manufacturer sometimes makes it impossible to do business with him. This may be true in some cases, but I question the truth of the statement as regards sugar machinery. I have been visiting Cuba and Porto Rico this last winter, and found as a rule in those up-to-date sugar islands that English machinery was much preferred to American. In Porto Rico there is a duty against English machinery of 45 per cent. . . . This 45 per cent. would naturally prevent the introduction of further English machinery; but such is not the case, as many of the planters inform me from their experience of American machinery, after having used English machinery, it would be to their advantage to pay the 45 per cent. duty so as to secure English machinery, and in some cases this has been done. This speaks for itself as to the superiority of the English sugar machinery. Many of the American ideas, I confess, are very clever and useful; but, in other cases, I have seen most elaborate and expensive machinery in use with results which could have been accomplished by labour on the spot for less money than the interest of the capital invested in the machinery adopted for the purpose.

Your correspondent hints that the English sugar engineers do not go with the times in improving their designs. This is contrary to the facts, as we are continually making new designs, and improving our machinery and methods for the manufacture of sugar, which is borne out by the low price at which the sugar is now produced in the West Indies—about £2 per ton under the cost at which beet sugar can be produced in Europe.

PAPAW JUICE.

The following note on the juice of the papaw appeared in the *U. S. Monthly Consular Reports* for June:—

Papaw juice is extracted from the fruit of the papaw tree, which grows rapidly, attaining its full bearing capacity in a year. It produces from forty to fifty papaws of a dark-green colour, ripening to a deep yellow, in shape resembling a squash. A very light superficial incision is made in the fruit, from which exudes a clear water-like juice, which on exposure to the air becomes opaque. As it drips from the fruit it is received in a porcelain-lined receptacle. As it is very corrosive, metal receptacles would injure its appearance and qualities. It possesses great digestive virtues, and the refined article is considered superior to all animal pepsins.

After the desired quantity has been collected, the juice is placed in shallow porcelain- or glass-lined pans and allowed to evaporate. While this is not a very delicate or difficult operation, it requires considerable attention, so that the juice will dry uniformly and the product be white and well granulated. In its granulated state it is shipped to the United States, undergoes a refining process, and is sold as the papaw of commerce for medicinal purposes.

The ripe papaw is palatable and an excellent aid to digestion. Meat wrapped in papaw leaves for a short time becomes quite tender without any impairment in appearance or taste.

In extracting the juice the hands should be protected by rubber gloves, as in its crude state it attacks the tissues. An average tree will produce about $\frac{1}{4}$ lb. of the granulated juice. It sells in the United States for from \$4 to \$6 per lb. in the crude state.



WEST INDIAN FRUIT.

DATE PALMS IN JAMAICA.

The following reference is made in the Annual Report of the Board of Agriculture, Jamaica, to the collection of date palms at the Hope Experiment Station:—

The collection of date palms is in excellent condition. They are regularly irrigated and sprayed with Bordeaux mixture to keep down the date palm fungus disease (*Graphiola phoenicis*). The cost of cultivation, irrigating, and spraying was £2 13s. 2d. for seventy palms.

SHOW OF COLONIAL FRUIT.

The Imperial Commissioner of Agriculture has received the following reply to a letter addressed to the British West Indian Fruit Co., Ltd., in reference to the representation of West Indian fruits at the Show of Colonial Fruits to be held in London by the Royal Horticultural Society on December 5 and 6 next:—

We beg to acknowledge receipt of your letter of the 3rd. instant, and have pleasure in informing you that we are making a collection of fruit from the various islands of the West Indies for the exhibition of the Royal Horticultural Society to be held in London on December 5 and 6. No doubt our Barbados office has communicated with you in regard to our proposal, and we trust to receive your co-operation in this matter.

All the fruit from the various islands will be sent home by the 'Tagus,' leaving this port on November 11 and Barbados on November 12.

TRINIDAD FRUIT TRADE.

The British West Indian Fruit Co., Ltd., of Trinidad, announces that it is prepared to buy Gros Michel, Governor Fig, and red fancy bananas at the rate of 1s. 9d. per payable bunch. A bunch of nine hands (and upwards) will be counted as one payable bunch; an eight-hand bunch as three-quarters of a payable bunch, and a seven-hand bunch as one-half.

Each hand must have at least twelve fully developed fingers: any hand with less will not count as a hand. All bananas are to be delivered fresh cut and free of bruises, and of the grade required, otherwise they will be rejected. Planters are cautioned not to supply bananas unless they fully understand the grade required.

Planters intending to plant bananas are invited to

communicate with Mr. A. F. Clark, the Manager, who is willing to give advice as to planting and cultivating.

Oranges will also be purchased by the company.

The bananas are to be delivered in Port-of-Spain fortnightly for each Royal Mail steamer sailing for England.

HYBRIDIZATION OF PINE-APPLES.

Reference was made in the *Agricultural News* (Vol. III, p. 420) to experiments at the Hope Experiment Station, Jamaica, in connexion with the hybridization of pine-apples. The Director of Public Gardens and Plantations makes the following remarks on this experiment in his report for 1904-5:—

The seedling pines that were planted out in nursery beds at 9 inches apart were lifted, treated as suckers, and replanted in raised beds in the pinery at 18 inches apart. All the beds have been mulched and the suckers are doing well.

The following hybrid pines fruited in May and June 1904:—

No.	1,	weight 2	lb., inferior.
"	2,	"	6½ lb., poor.
"	3,	"	3½ lb., fairly good.
"	9,	"	2½ lb., good in flavour, but dry.
"	20,	"	2 lb., poor.
"	26,	"	3½ lb., very juicy, good flavour.
"	31,	"	3 lb., very good flavour.
"	32,	"	5 lb. 7 oz., an excellent fruit, very sweet and juicy.
"	34,	"	2 lb. 1 oz., good shape, but had been attacked by ants and birds and unfit for use.

Suckers and slips from the parent plants are planted in a raised bed in the pinery.

The work of cross-pollination was continued this year. By permission of Mr. G. L. Lucas, the following crosses were made at the Kensington pinery:—ten Sugar-loaf crossed with Ripley, ten Ripley crossed with Sugar-loaf, three Bull-head with Ripley, three Ripley with Bull-head, four Black Jamaica with Ripley, one Ripley with Black Jamaica. The following were also crossed at Hope:—twenty-two Smooth Cayenne with Ripley, twenty-three Ripley with Smooth Cayenne, one Sugar-loaf with Ripley, and Ripley with Queen.

Seeds (560 in number) were collected and sown. A packet of seed of La Brea or Pitch Lake pine was received from Trinidad. Nineteen have germinated. Seedlings (560 in number), Cayenne crossed with Ripley and Ripley crossed with Cayenne, are in small pots and will be planted out in nursery beds at 9 inches apart.



INOCULATION OF SOIL FOR ALFALFA
IN DOMINICA.

The following interesting report has been received from Mr. A. J. Brooks on an experiment carried out at the Agricultural School at Dominica in inoculating the soil for alfalfa.

The seed was treated with the culture received from the U. S. Department of Agriculture in June last. Up to the present only one reaping has been made. While the experiment is by no means conclusive, it shows that good results may be expected. The experiment will be continued, and it will be possible, later on, to state definitely whether alfalfa can be grown successfully as a fodder crop at the Agricultural School at Dominica:—

A plot of land previously occupied with tannias was chosen for the purpose. It was divided into equal parts and separated by a deep drain to prevent the bacteria from entering the untreated plot.

Two and a half pounds of alfalfa seeds were received and divided into equal weights of 1¼ lb. One lot of seeds was then taken and inoculated in accordance with instructions received. Both lots of seeds were then sown, the soil of the plot being a sandy loam.

No difference was observed in the rates of germination and there was no apparent difference in the growth of the plants until two months after germinating. The inoculated plants then appeared to be a little stronger and of a deeper green colour.

In comparing individual plants, those in the ‘inoculated’ plot are much more branched and slightly taller; but the most striking difference is in their healthier appearance.

The average size of the plants at the flowering period was approximately as follows:—

Inoculated	...	...	7 feet to 8 feet.
Untreated	...	...	6 feet to 7 feet.

Six average plants were carefully taken from each plot for an examination of the roots, and the results were as follows:—

In every case the roots of the inoculated plants were much longer (in some instances as great a difference as 3 feet), thicker, more branched, and the nodules more numerous, but the latter did not appear to differ in size.

The difference between the general appearance of the two plots was that the inoculated plants appeared stronger, of a deeper green colour and much healthier, whilst the plants in the untreated plot appeared yellowish and as if suffering from the drought.

The first reaping was made on September 21, the plants were in flower and of an average height of 7 feet, thus taking three and a half months from the time of sowing to the flowering period.

The yield was as follows:—

		Wet.	Dry.
Inoculated plot	...	85 lb.	19 lb.
Untreated „	...	56 „	13 „

The gain of inoculated over untreated was therefore 28 lb. (wet) and 6 lb. dry. The percentage gain of inoculated over untreated was 50 per cent.

COMPOSITION OF JAMAICA CORN.

The following extract from a paper on Jamaican fodders by Dr. H. H. Cousins, dealing with the composition of Jamaica corn, is reproduced from the *Bulletin of the Department of Agriculture, Jamaica*, for October:—

MAIZE OR INDIAN CORN.

A special study of the composition of country corn as compared with the imported American corn has been made by Mr. E. J. Wortley, of this department, and the results of his analyses are here given. The outstanding features of this investigation are (1) the great superiority of country corn over the imported corn as a source of albuminoids, and (2) the excessive amount of moisture in the country corn. Calculated on a uniform basis of 12 per cent. moisture, country corn shows a content of over 10 per cent. of albuminoids as against a little over 7 per cent. in the imported article.

The prejudice against country corn among horse keepers has arisen simply from the excessive moisture and the liability of such corn to ferment and give horses colic. If properly dried, our native product is decidedly superior to the imported corn. To secure immunity from fermentation corn should be dried to a content of 12-13 per cent. of moisture. This was attained with the corn at the Experiment Station at Hope by drying for twelve days.

GUINEA CORN OR SORGHUM.

The analysis of this corn shows that it contains 12 per cent. of albuminoids and is decidedly superior to any sample of maize in the list.

In olden days Guinea corn was an important staple and formed one of the chief foods of both man and beast in Jamaica. It is of interest to record so favourable a composition for a crop grown with such simple culture and capable of such good returns in dry districts.

ANALYSES OF CORNS.

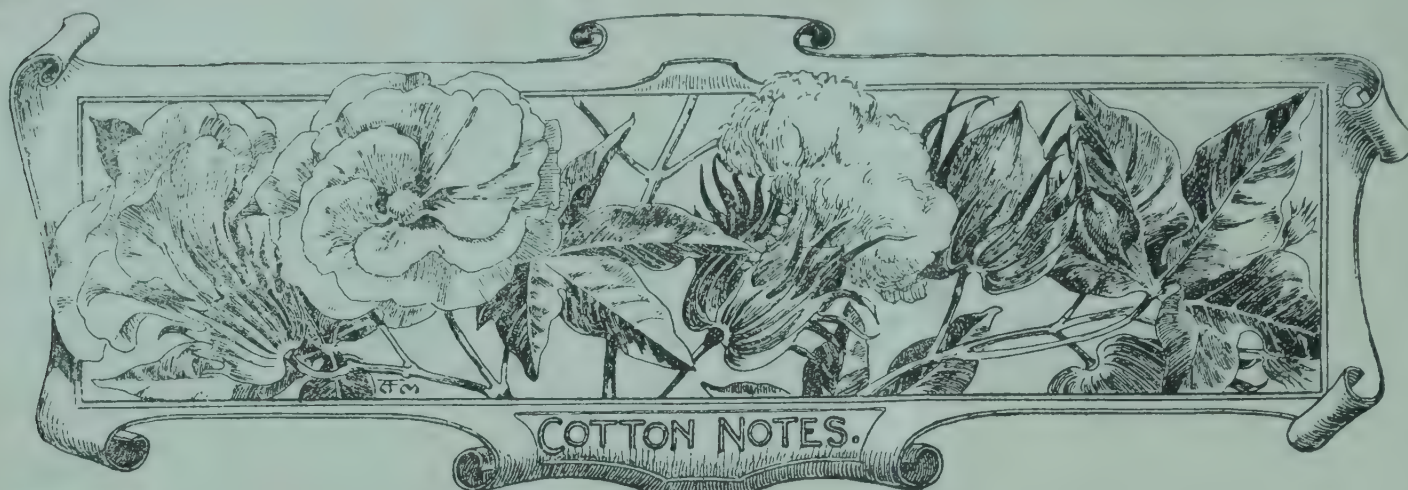
Constituents.	Imported Corn.	Country Corn. (Bought.)	Country Corn. (Grown at Hope.) ¹	Guinea Corn.
Moisture	11.97	12.46	12.71	10.99
Ash	1.23	1.38	1.21	1.64
Total nitrogen	1.15	1.68	1.57	1.93
Albuminoids	7.11	10.50	9.82	11.96
Fat	4.24	4.52	4.83	4.56
Fibre	1.21	0.93	1.86	1.36
Albuminoids on basis of 12 per cent. moisture...	7.20	10.60	9.90	

¹ Dried twelve days on cob.

BRITISH HONDURAS BOTANIC STATION.

Many nutmeg plants, which were introduced into the colony and distributed by the Botanic Station, are beginning to bear fruit. The climate and soil of British Honduras appear to be favourable to this product.

Much useful and important work was done in the nursery attached to the Botanic Station in Belize during the year, and a great number of plants were raised and distributed to meet the requirements of the planting season. (*Annual Report on British Honduras for 1904.*)



DESTRUCTION OF OLD COTTON PLANTS.

It has been frequently urged in these columns that the prospects of the Sea Island cotton industry in the West Indies will be seriously injured if planters fail to carry out the recommendations of the Imperial Department of Agriculture to destroy old cotton plants. With the view of again giving prominence to this important matter, the following, which has been issued in leaflet form by the Superintendent of Agriculture for the Leeward Islands, is reprinted:—

In the pages of the *Agricultural News*, by addresses at meetings, and by the personal advice of officers of the Department of Agriculture, the attention of cotton planters has been repeatedly drawn to the danger of leaving old cotton bushes on the land and of attempting to ratoon cotton by allowing the bushes to remain from one season to another.

The chief danger arising from this bad practice is that old cotton is usually attacked by various pests and diseases, particularly the leaf-blister mite. This dangerous pest is in this way spread to young cotton and may endanger the success of the whole cotton crop.

Every one is, therefore, most particularly urged to destroy any old cotton bushes which may be on his land, and also to destroy the young shoots which may spring up where old cotton has been cut down, for these young shoots are often badly diseased. The old cotton bushes should be carefully got up by the roots and burned.

Owners of old cotton bushes should clearly recognize that these old infected bushes are a source of danger to themselves and their neighbours and should be public spirited enough to destroy them even where they themselves have no cotton of their own in the immediate neighbourhood.

The principal risk which the cotton industry has to face is danger arising from various pests; if there is combined effort to stamp out these pests a successful cotton industry is possible, but negligence, even on the part of a few, may imperil the whole industry and cause a commercial catastrophe which may now be serious. The matter therefore calls for energetic and public-spirited action.

As bearing on this subject it may be of interest to publish the following extract from an article in the *Tropical Agriculturist* by Mr. E. Ernest Green, Government Entomologist, Ceylon, which shows that there, also, it is found necessary to treat cotton strictly as an annual, as the bolls are attacked by a small worm:—

As mentioned in my June notes, our experience in Ceylon tends to show that it is the second crop from the cotton bushes that is the most seriously affected. This being so, we shall have to treat our cotton strictly as an annual,

to be rooted out and burnt immediately after the harvesting of the main crop. By these means we may hope to keep the pest under some control.

The perennial habit of most of our Ceylon products and the absence of any winter, during which insect life is dormant, add very greatly to our difficulties in the control of insect pests. Where we have a plant like cotton, that can be grown as an annual, it would be foolish to lose the advantage afforded us and to allow successive crops to straggle on and overlap each other. I would even advocate that something in the nature of a 'close season' should be recognized—regulated to suit the weather conditions in different districts—during which no living cotton plants should be allowed to remain in the ground.

USES FOR SEA ISLAND COTTON.

Reference has been made in these columns to the steadily increasing demand for Sea Island cotton in the United States. It has also been predicted that the crop in the Sea Islands will be short this season. Interest therefore attaches to the following note in the *Cotton Trade Journal*, of Savannah, Georgia, on the extended uses to which Sea Island cotton is being put:—

The indications are that Sea Island cotton will be more largely used during the coming season than ever before, not that there is to be any unexpectedly unusual demand for it, but because every year finds more uses for the staple. And once Sea Island cotton is adopted for a particular purpose, it is steadily used until a better product is found, which is seldom the case.

It will probably be some time before a better material for mail bags, for instance, is found than Sea Island cotton, which was adopted some years ago after a number of severe tests of all kinds of materials by the Government. Hence, for this purpose, there is a fixed, assured demand for Sea Island cotton. The Government must have the bags made of such material as it specifies in its contracts. The same is true of numerous other things for which Sea Island cotton is used, and for which either rigid contracts or good policy forbids substitutes. More than in any other staple, therefore, is the demand for Sea Island probably fixed to an extent, and cannot well go down-hill.

As new uses are found for this cotton with the progress of invention, the demand becomes the more stable, and promises to remain around a certain, fixed, minimum requirement. It is to be noted that more uses are being found for Sea Island cotton in this country than abroad. This being the case, and the fixed requirements being expected to increase rather than decrease, it is likely the new season will find many mills adopting this cotton for some use or other.

EXPORTS OF WEST INDIAN COTTON.

The following is a statement (furnished by the Custom's Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West Indian Colonies during the quarter ended September 30, 1905:—

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	202	66,635	£3,332
St. Vincent ...	8	1,337	67
St. Kitt's ...	8	1,554	78
Nevis ...	66	13,063	653
Antigua ...	73	12,516	626
Grenada ...	37	12,100	185
Jamaica ...	67	9,864	493
Trinidad and Tobago ...	21	7,589	196
	482	124,658	5,630

The following is a statement showing the amount of Sea Island cotton exported from the West Indian Colonies (in order of output) for the period January 1, to September 30, 1905:—

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	791	274,998	£13,750
Nevis ...	724	144,721	7,235
St. Vincent ...	298	97,152	4,857
St. Kitt's ...	254	76,899	3,845
Montserrat ... *	146	70,723	3,486
Grenada (Marie Galante) ...	704	212,722	2,693
Antigua ...	296	52,656	2,633
Jamaica ... †	217	44,608	1,929
Anguilla ...	158	30,977	1,550
Trinidad ...	42	12,981	386
Virgin Islands ... *	18	3,600	120
British Guiana ...	8	1,258	36
St. Lucia ... *	33	988	25
	3,689	1,024,283	£42,545

CLAYED V. UN-CLAYED CACAO.

The following article entitled: 'Clayed v. Un-clayed Cacao from the Spanish Main,' appeared in *Tropical Life* for September:—

We find it strange that estate owners in Venezuela still ship their cacao covered with dirt and heavily clayed, just as they did in the old days when manufacturers and buyers of produce from remote or semi-civilized centres used to insist on certain native crudenesses (as, for instance, the bees that were poured into the moulds with the tallow dips to make pure wax) in order to be assured that what they were buying was genuine. Every one knows the genuine Criollo beans when he sees them, if he knows anything about cacao at all,

* Returns for the September quarter have not yet been received.

† Estimated number of bales.

and also every one acquainted with Venezuela knows that the red clay found in the small area associated with choice Spanish main cacao is often carried to the other districts to colour inferior cacao with the idea of giving it the appearance of choice Caracas. For this reason alone it is time that the choice grades gave up the clay lest it be confounded with commoner sorts, but when one thinks of waste in freight on the clay and the trouble it must give to the maker, the marvel is that the practice of heavily-clayed choice Venezuelan has been kept up so long.

The other day we were shown some beans from General Fonseca's estates at Ocumare. These had not been clayed, but instead had been dried in a cacao drier made by John Gordon & Co., London. After the sweating process, without being either 'danced' or polished by hand, its bright appearance being obtained, we were told, in the drying machine, the appearance of the beans was clean, palish-red, very bold and plump, with the usually thin outer shell, and an almost satiny appearance, like fine Ceylons or Samoa cacao (which are probably its grand-children).

If such cacao can be obtained without putting the beans on to the dirty ground whilst still wet from the sweating heap, it really does seem a mistake to hide so attractive an exterior under a coating of dirt and clay. And if the artificial drier can turn out such cacao, we would strongly recommend our Venezuelan and other friends, especially in districts where the rainfall is heavy, to study the matter of drying by artificial heat, and, above all, instead of heavily claying the beans, to ship over a clean and polished exterior like the samples we saw from the estate of General Fonseca.

BRITISH GUIANA FISHERIES.

The following information in regard to fisheries is extracted from the British Guiana *Blue Book* for 1904-5:—

The fish most plentiful during a year's inspection of the market was the bashaw, three or four species of which are found. Next in order comes the cuirass, a so-called skin fish, that is, one of the Siluridae. The querriman (*Mugil braziliensis*); the gilbacker (*Silurus parkeri*); flounders, so-called (*Solea gronovii*); the snook (*Centropomus undecimalis*); mullets (*Mugil liza*); porgies (*Stenotomus* sp.) three or four kinds; hassars (*Callickthys littoralis*); jew fish (*Plectropoma Chlorurum*); butter fish (not unlike whiting); snappers (*Naeomænis*); garfish (*Belone*); shad (*Clupea maccauwocca*?); cuffum (*Tarpon atlanticus*); pacuma (*Batrachus surinamensis*); four eyes (*Anableps tetraphthalmus*); houri (*Macrodon intermedius*), and many species of Siluridae; crabs, three species, and prawns and shrimps, four species. The amount of shrimps consumed in the colony is enormous and must run to tons weekly. The coolies use them in their curries and the black people in their foo-foo.

The before-mentioned are mostly sea and estuarial fishes; but the rivers of the interior abound in many fine species. The largest perhaps is the arapaim Gigas. There are various species of perai (*Serrasalmo*); leukanani (*Cichla*); the paca (*Myletes Pacu*) is a valuable food-fish to the Indians, as are also the cartabac (*Tetragonopterus latus*); the haimara (*Macrodon trahira*); moracot (*Myletes*); biara (*Cyonodon Scombroides*); yarrow, dawalla (*Hypothalus dawalla*); tubuguri (*Prochilodus insignis*); kurumai (*Chalcens macrolepidotus*). The best sporting fishes of the colony are the cuffum or tarpon (*Tarpon atlanticus*); leukanani (*Cichla ocellaris*); and biara (*Cyonodon Scombroides*). All these will take fly or spoon eagerly.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

VOL. IV. SATURDAY, NOVEMBER 11, 1905. No. 93.

NOTES AND COMMENTS.

Contents of Present Issue.

The work of the Imperial Department of Agriculture in St. Lucia during the last two years is briefly reviewed in the editorial in the present issue.

Notes in connexion with the sugar industry deal with (1) the improvement of the sugar-cane, (2) the successful cultivation of the West Indian seedling cane D. 74 in Louisiana, and (3) the general progress in the West Indian sugar industry.

A report on the inoculation of the soil for alfalfa at Dominica is published on p. 341. The same page contains a note on the composition of Jamaica corn.

The attention of cotton growers is directed to the article on p. 342 on the destruction of old cotton plants.

The fiddler beetle, well known for some time as a serious pest in orange cultivation in Jamaica, is now reported as a pest also of cacao. (See p. 346.) Directions are given on the same page for dealing with the cigarette beetle and similar pests of stored goods.

Annual Reports of the Boards of Agriculture at British Guiana and Jamaica for 1904-5 are briefly reviewed on p. 347.

Dr. Watt's paper on ascertaining the strength of concentrated lime juice by means of the hydrometer is likely to be read with interest by lime planters.

Notes on the progress of agricultural education at Grenada and Trinidad are published on p. 350.

Agricultural News.

Beginning with this issue of the *Agricultural News*, a change is being made in the day of issue, on account of the alteration in the sailings of the Royal Mail steamers.

This issue (No. 93) is dated Saturday, November 11, instead of Saturday, November 4, and is being distributed by the intercolonial mails leaving Barbados on November 8.

While the *Agricultural News* will be published, as heretofore, on every alternate Saturday, it will be ready for distribution on the preceding Wednesday, in time for the intercolonial mails. Copies for England will go by the mail steamer leaving Barbados the day after the date of publication.

Rice Cultivation in British Guiana.

According to the Annual Report of the British Guiana Board of Agriculture for 1904-5, the area under rice cultivation in that colony has undergone a large increase. The total area in 1904-5 was 21,920 acres, as against 16,670 acres in the previous year. The yield of paddy increased from 17,701 tons to 22,597 tons.

There are indications that still larger increases may be expected in the immediate future. 'The fact that some of the new varieties of cane give heavy yields on parts of the back lands of sugar estates where the Bourbon was not able to produce remunerative returns, has set free from cane cultivation lands in the front estates, and this is being eagerly taken up by East Indians for rice growing. The negroes of the colony are slowly following the example of the East Indians and are cultivating rice on some of their village lands.'

Cohune Nut Cracking Machine.

The *Journal of the British Honduras Society of Agriculture and Commerce* for March 1905 contains a letter from the Director of the Imperial Institute relative to a suitable machine for extracting the kernels of the nuts of the Cohune palm (*Attalea Cohune*).

Dr. Dunstan states that, so far, it has proved to be impossible to devise a completely satisfactory machine for this purpose. The only machine that has been at all successful is one sold by Messrs. A. Miller, Brothers, & Co., of Liverpool. It breaks the shells of the nuts but, unfortunately, is liable to damage a large proportion of the kernels.

In recommending that experiments be carried out with this machine in British Honduras and that a trial shipment of kernels extracted with it be made, Dr. Dunstan remarks that it will be necessary to separate the broken kernels from the unbroken and consign the two classes separately.

As the objection to shipping broken kernels is that there is likely to be a deterioration and loss of oil, it is suggested that efforts might be made to express the oil locally, in which case it would not matter whether the kernels were extracted whole or broken. The residue could be used as a food-stuff or a manure.

West Indian Bulletin.

The *West Indian Bulletin* (Vol. VI, no. 3) will be issued in time for distribution by next mail.

This number contains valuable information in regard to the cotton and cacao industries; also a paper by the Hon. Francis Watts on the soils of Montserrat.

An article on the bud-rot disease of the cocoa-nut palm contains all the available information in regard to this disease, which is at the present time causing considerable anxiety all over the West Indies.

St. Vincent Cotton Growers' Association.

At a meeting of the St. Vincent Cotton Growers' Association, held on October 4, a discussion took place as to the advisability of transforming the association into a general agricultural society. Mr. C. J. Simmons remarked that by extending the scope of the association so as to embody all matters concerning the agricultural and commercial interests of the island, the usefulness of the body would be increased.

A motion was thereupon carried that the Imperial Commissioner of Agriculture and the President and Vice-president of the association should be informed that it was the wish of the members to form themselves into a general agricultural society to be styled, perhaps, the Cotton Growers' Association and Agricultural and Commercial Society.

The Imperial Commissioner of Agriculture has since expressed the opinion that this proposal is likely to extend the usefulness of the association and to enable it to deal with several matters of interest to the island.

Extirpated West Indian Birds.

The *Auk* for July 1905 contains a paper by Mr. Austin H. Clark on 'Extirpated West Indian Birds.' Mr. Clark has brought together all the evidence as to the existence in former years of birds not known at the present time in Barbados, St. Vincent, the Grenadines, and Grenada. Reference to a few of these may be of interest.

The pied-billed grebe, formerly known in Barbados as the 'two-penny chick,' is not found at the present time; the name 'two-penny chick' is now applied to the sora (*Porzana carolina*).

The West Indian buzzard is recorded as occurring in Barbados by Ligon (1673), when the greater part of the island was still clothed in natural forest.

The description by Hughes in 1750 of the 'wild wood pigeon' evidently refers to the ramier (*Columba squamosa*), which, although abundant in the neighbouring islands, does not now visit Barbados.

The quaking thrush is recorded by all the old observers as occurring in Barbados, but has probably been driven away by the deforestation of the island. At the present time it occurs on all the islands from Guadeloupe south to St. Vincent.

It is also stated that *Allenia albiventris*, which became a resident in the Grenadines after the hurricane at St. Vincent in 1898, has now entirely disappeared from these islands.

Subsidiary Industries in the Seychelles.

In consequence of the unsatisfactory position of the vanilla industry in the Seychelles, it has become necessary to devote attention to the promotion of subsidiary industries.

The most promising of these at the present time is the cocoa-nut industry. The total value of the exports of cocoa-nut products in 1904 was £19,666, as against £16,445 in the previous year.

It is mentioned in the *Annual Report* for 1904 that the demand for copra and the good price secured have diverted much of the product from the manufacture of oil to that of copra, the export of which has increased from 30,458 kilos. in 1903 to 267,200 kilos. in 1904. [1 kilo. = 2.2 lb.] The production of copra appears to be capable of wide development.

This may also be said of the production of cacao, the exports increasing from 3,824 kilos. in 1903 to 6,122 kilos. in 1904.

The Curator of the Botanic Station, who was sent to Ceylon in 1902, arranged for the introduction of new varieties of economic plants. During 1904, 10,000 selected cocoa-nuts, 6,000 nutmeg seeds, 20,000 cacao seeds, and large quantities of Para rubber seeds were received. It will thus be seen that everything is being done to enable the planters to engage in the production of other products than vanilla.

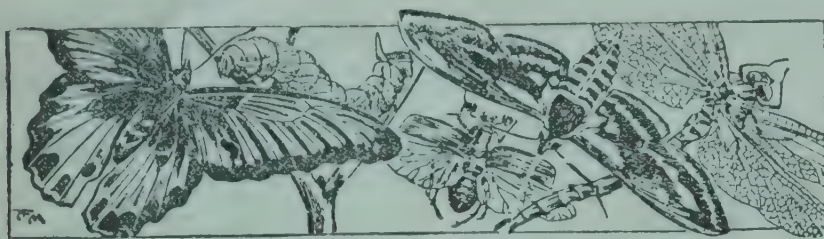
Jamaican Fodders.

A short note was published in the *Agricultural News* (Vol. II, p. 409) reviewing a paper on Jamaican fodders by Dr. H. H. Cousins. Extracts from this paper were afterwards reprinted in the *West Indian Bulletin*, Vol. V, pp. 100-13. Dr. Cousins publishes a further paper on this subject in the *Bulletin of the Department of Agriculture, Jamaica*, for October.

Jamaica hay grass (*Sporobolus indicus*) was found on analysis to present a very favourable composition when young. Stock breeders fully realize the value of this grass when young and succulent; experience has also shown that this value is greatly reduced as it gets old, hard, and wiry. Dr. Cousins suggests that the use of light American horse mowers would secure an enormous supply of valuable fodder from the large areas of hay grass lands.

Analyses of bamboo fodder show that this material is highly nitrogenous. Horses and cows eat bamboo leaves with relish, and it would appear that bamboos might afford a good stand-by in times of drought.

The results of the examination of Guinea grass bring out clearly the necessity for cutting this fodder at the right time, since great deterioration results from the seeding of the grass. Guinea grass, cut when the flowering spikes were being produced, contained 5.13 per cent. of albuminoids and 34.21 per cent. of carbohydrates in the air-dry material, as against 2.00 and 25.03 per cent. respectively, in grass as fed to dairy animals when it was actually seeding. It will thus be seen that, if the grass is allowed to flower and form seeds, the value of the fodder is reduced to about one-third.



INSECT NOTES.

Fiddler Beetle attacking Cacao.

The fiddler beetle (*Praepodes vittatus*) is a well-known pest of oranges in Jamaica, where it is now recorded as also attacking cacao. A discussion appears in the *Bulletin of the Department of Agriculture, Jamaica*, for October, from which there would seem to be some difference of opinion as to whether the beetle attacks healthy trees or only such as are weakened by unfavourable conditions of soil, drainage, etc.

Articles published in the *Agricultural News* (Vol. I, p. 100; Vol. II, p. 244; Vol. III, p. 266) give accounts of this insect and its attacks on oranges, and another article (Vol. II, p. 298) gives an account of trapping the adult beetles on sunflower heads, and it is recommended that these be planted in the orange groves. Sunflowers should be in flower from March to June, when the adults are most plentiful. The blossoms should be inspected every day, and the beetles collected and destroyed.

Dr. Cousins recommends the hand-picking of adults, the application of Paris green to the leaves to kill the adults, and the use of carbon bisulphide in the soil at the base of infected trees to kill the larvae. It would seem that planters who systematically carry out these recommendations should not experience serious injury to their trees from the attacks of the fiddler beetle.

Cigarette and Biscuit Beetles.

Specimens were recently received by the Imperial Department of Agriculture of a small beetle reported to be seriously injuring the boots and shoes in a Bridgetown store. On examination this proved to be the cigarette beetle (*Lasioderma serricornis*).

The cigarette beetle is a member of the family Ptinidae, and is well known as a pest of cigarettes, cigars, and leaf tobacco. In addition, it is known also to attack herbs and drugs, such as ergot, tumeric, cayenne pepper, ginger, rhubarb, etc., and foodstuffs. It has been reported as destructive to silk and plush, and has at times been destructive to herbarium specimens.

Other species of the family Ptinidae are very similar in habit and appearance to the cigarette beetle. The drug-store beetle (*Sitodrepa panicea*) or biscuit beetle, as it is commonly called, is a serious pest of stored foodstuffs, herbs, drugs, books, hides, and skins, and it also attacks tobacco in the same way as the cigarette beetle. These insects are very small and inconspicuous, being only about $\frac{1}{10}$ inch in length. They are not often noticed, but the damage they do cannot be overlooked. Perhaps the most conspicuous injury is that done by the so-called book-worm, which leaves small round holes in books, card boxes, photographs, etc. This injury is probably generally caused by the biscuit beetle or a closely related species (*Ptinus fur*) and is most generally to be seen in old books, the bindings and covers of which seem to be a favourite food.

In dealing with these insects carbon bisulphide will probably prove the most useful insecticide. The use of carbon bisulphide has been fully explained in the *Agricultural News* (Vol. III, p. 29). For treating a small

quantity of infested material a tight box or barrel with a tight-fitting cover may be used. The material is placed inside and carbon bisulphide poured into a plate or shallow dish at the top of the receptacle, the cover being quickly put on and made as tight as possible.

For dealing with large quantities fumigation may be carried on in a tight room. Carbon bisulphide is employed in this way at the rate of 1 lb. to 1,000 cubic feet of space. For an ordinary flour barrel one or two teaspoonfuls ($\frac{1}{8}$ to $\frac{1}{4}$ oz.) should be used.

It should be borne in mind that carbon bisulphide is a highly inflammable liquid. A lighted cigar or pipe or even a glowing match is sufficient to set it alight, if brought into contact with the vapour. As the vapour of carbon bisulphide is heavier than air, the liquid should be placed as near as possible to the top of a box or barrel used for fumigating, or on shelves 4 feet or more above the floor of the room which is being fumigated. Carbon bisulphide has a very strong, offensive odour and is fatal to insect life. There is no danger to the person using it, if only a small quantity is breathed, the odour quickly passes away when exposed to the air, and articles of food or clothing, books, etc., are unharmed by it.

Small quantities of flour, meal, and other foodstuffs may be disinfected by being first passed through a fine sieve to get out the beetles and larvae and then heated in an oven to about 125° to 150° F. to kill the eggs. If the infestation by these pests becomes severe, it will be necessary to repeat the treatment from time to time.

The life-cycle of these beetles occupies a very short time, possibly only from six weeks to two months, and as breeding is probably continuous all the year round in the tropics, it will be seen that they are likely to increase in numbers very rapidly once they become established.

PARA RUBBER IN MALAY STATES.

The *Board of Trade Journal* of September 28 has the following note on the extension of the Para rubber industry in the Federated Malay States:—

The Report on Experimental Plantations in the Federated Malay States in 1904 states that agricultural interests in those States is almost entirely centred in the cultivation of the Para rubber tree. This cultivation has now got well beyond the experimental stage, and there is no longer any doubt as to whether the tree is suited to the conditions obtaining in the Federated Malay States, or whether its cultivation will prove remunerative. Tapping on a commercial scale has commenced on several estates, the exports for the year ending December 31 last, amounting to 105 pikuls (about 14,000 lb.) valued at over \$28,000; but, as the oldest estates are just coming into bearing, this amount will be greatly exceeded in the near future. The prices realized have exceeded the most sanguine expectations, having averaged almost 1s. per lb. more than 'fine Para,' the price of which has advanced nearly 30 per cent. during the last twelve months. The fact that 'plantation Para' advanced 1s. 6d. per lb. during the year 1904, as against a rise of 1s. 2d. per lb. for 'fine Para' would seem to show that, in the opinion of the manufacturer, the value of 'plantation Para' increases on acquaintance. The report adds: 'There is little doubt, provided the quality is kept up to the present high level, that, if the supply of high-grade rubber ever exceeds the demand, the cultivated product will be the last to suffer; moreover, it seems more than probable that, owing to its quality, the facility and comparatively low cost at which it can be harvested, "plantation Para" will eventually oust the native product from the markets.'



BRITISH GUIANA: ANNUAL REPORT OF BOARD OF AGRICULTURE, 1904-5.

A statement is given of the principal subjects which occupied the attention of the board at its four general meetings. Short accounts are also given of the work done by the various committees.

The board imported the following animals during the year: one shorthorn bull, two Berkshire boars, and two Shropshire rams.

The Sugar-cane Experiments Committee obtained and published returns of the areas under cultivation of varieties of canes other than Bourbon. These showed that 12,942 acres were in cultivation with new varieties for the crop of 1905, and a total area of 14,743 acres in canes other than Bourbon.

The report on the results of the experiments in the crop-year 1904-5 indicated that the locally raised canes Nos. D. 625, D. 145, and D. 109 were of high value as sugar producers in British Guiana, while the following introduced varieties were also of much promise: B. 208, B. 147, and Sealy Seedling.

The Subsidiary Products Committee has advised with regard to experiments with products other than sugar. Experiments have been carried on with twenty varieties of imported rice, as also with cotton, bananas, cacao, etc.

JAMAICA: ANNUAL REPORT OF BOARD OF AGRICULTURE AND DEPARTMENT OF PUBLIC GARDENS AND PLANTATIONS, 1904-5.

Board of Agriculture.—The board has directed the experiments in progress at the Hope Experiment Station and the local agricultural experiments. It has considered and advised on the educational work in agriculture for students at the government laboratory; and for elementary school teachers, training college students, apprentices and industrial school boys at Hope Gardens. It has arranged for the work of Mr. Teversham, the lecturer of the Imperial Department, and of the Travelling Instructors, Messrs. Cradwick and W. J. Thompson.

Agricultural Experiment Work.—This section of the report deals with the work done at the Hope Experiment Station, local manurial experiments, and the work of the sugar experiment station.

There are at the station collections of a large number of varieties of the following: bananas and plantains, cassava, tannias, citrus plants, pine-apples, sugar-cane, sweet potatoes, etc.

An experiment was laid out for the purpose of ascertaining the best conditions for cacao in regard to shade, distance of planting, etc. The work of raising hybrid pine-apples was continued; 560 plants of Cayenne-Ripley and Ripley-Cayenne are in small pots. Seedling sugar-canes are also reported to be making progress.

Local manurial experiments were carried on with sugar, bananas, and cotton, on estates situated in different parts of the island.

Agricultural Educational Work.—This part of the report deals first with the work of the Lecturer of the Imperial Department of Agriculture. Satisfactory progress is reported in introducing the teaching of agricultural principles into elementary schools.

The training of industrial school boys, garden apprentices, laboratory students, training college students, and elementary school teachers has been continued.

The training of agricultural students at the government laboratory has been carried on as in previous years.

With regard to the Travelling Instructors, it is stated that Mr. Cradwick, in the course of his duties, conducted the judging in connexion with the prize-holding scheme of the Agricultural Society, assisted teachers in the establishment of school gardens, and addressed meetings of the local agricultural societies.

Mr. Thompson carried out work on similar lines in the parishes near Kingston.

PARA RUBBER AS SHADE FOR CACAO.

A valuable report, recently issued by the Royal Botanic Gardens of Ceylon on Para rubber, discusses the suitability of this tree for shade purposes. It has been freely planted throughout tea plantations at a distance of from 10 to 15 feet apart. The effect on many plantations has been to rob the tea of its plant food and cause the latter to present a weak and straggling appearance. It is predicted that, on this account, large areas of tea will soon have to be abandoned.

The effect of interplanted rubber in cacao plantations is discussed in this Circular (Vol. III, No. 6) as follows:—

The greater part of the cacao in Ceylon is usually interplanted with trees of species of *Erythrina* for protection against wind and for shade purposes. The mature cacao trees on most places are usually from 10, 15, to 20 feet apart, and their roots do not closely ramify through the soil as in the case of tea planted 3 to 4 feet apart. The amount of soil on good cacao estates which is free from cacao roots is often remarkable, as any one may see by digging trenches or holes in such land. We have therefore in cacao a product which can be grown to advantage under the shade of other trees and a soil on such estates which will allow the roots of trees other than cacao to develop without doing much damage to the cacao.

The Para rubber tree grows to a considerable height and is capable of offering shade and protection from wind in a manner similar to the Dadaps (*Erythrina lithosperma*) so commonly used. Furthermore, the leafless phase, through which the mature Para trees annually pass, allows the light to penetrate to the cacao trees during the hot dry months of February and March and thus helps to keep the cacao fungus in check. The fall of leaf every year greatly adds to the amount of organic matter which is acknowledged to be in great demand by the cacao.

It is therefore obvious that cacao under rubber will, if the latter is not planted too close, last much longer than tea under the same product, and with careful judgement the two products may be profitably grown for many years to come. In all such cases it need hardly be stated that the shade trees other than the rubber should be almost or entirely removed, as otherwise the dense shade will offer far too suitable conditions for the development of the cacao fungus, a parasite which requires constant attention.



GLEANINGS.

Mr. E. Lomas Oliver writes: 'Please impress upon all the planters above everything to pick the cotton *RIPE*.'

At a recent meeting of the Antigua Agricultural and Commercial Society several members testified to the effectiveness of the Liverpool rat virus.

The Agricultural Instructor at St. Lucia is in a position to supply some thousands of plants of *Castilleja elastica* at 3d. each, in boxes, delivered at Castries.

As shown elsewhere, during the nine months ending September 30 last, 1,024,283 lb. of cotton have been exported from the West Indies of the value of £42,545.

A cassava factory has been started at Richmond, Jamaica, by a gentleman from Grenada. He manufactures seven different articles from the tuber—starch, farine, tapioca, cassareep, meal, etc. This is an industry worthy of the support of the small settlers. (*Jamaica Daily Telegraph*.)

At a meeting of the Jamaica Agricultural Society held on October 18, it was decided to hold a conference of gentlemen representing the orange industry to consider the subject of shipping oranges. The following points will be submitted for consideration: Definition of immature orange; inspection; exclusion of immature fruit, and trade marks.

The total acreage planted in Sea Island cotton in St. Vincent during the present season is estimated to be 770 acres. Though this is considerably less than the area planted last year, better work is being done with the smaller acreage and there are at present indications of heavier returns, the prospects of the crop being extremely good.

The Grenada Agricultural and Commercial Society has decided to be represented at the Colonial Products Exhibition to be held in Liverpool in February next. The offer of the Secretary of the West India Committee to make the necessary arrangements has been accepted, and he has been asked to keep for this purpose any of the exhibits sent for the Colonial and Indian Exhibition which he may think suitable.

It is desired to correct an error in a review of the Report on Economic and other Experiments at St. Kitt's-Nevis, 1904-5, which appeared in the *Agricultural News* (Vol. IV, p. 317). The estimated value of the exports of cotton from St. Kitt's-Nevis and Anguilla for the fifteen months ended March 31 last was stated to be £83,074. This should be £8,307.

According to the report of Messrs. Henry W. Frost & Co., the estimates of the Sea Island crop for Florida, Georgia, and South Carolina range around 90,000 bales. Last year's crop for these states was 99,663 bales.

It is mentioned in the *Annual Report* on Seychelles for 1904 that inquiries had been received as to the resources of the colony in bread-fruit, with the view of supplying the increasing demand, especially at Marseilles, for cheap and nutritious food for stock.

In reference to the note in the *Agricultural News* (Vol. IV, p. 316) to the effect that plants of *Coffea robusta* were being offered for free distribution by the Superintendent of the Royal Botanic Gardens in Trinidad, it should be mentioned that the free grant, which was intended for Trinidad only, has now been exhausted. One hundred and fifty-four estates were supplied with one dozen plants each.

The Canadian Commercial Agent at Kingston, Jamaica, (Mr. G. E. Burke) reports that, as a result of the buoyancy of sugar prices, a decided revival of the industry is in evidence in Jamaica, not only among the large landed proprietors, but also with the peasantry. Hundreds of small cane mills are being imported from the United States. These mills are admitted free of custom duty, and sell for £10 10s. each. (*Board of Trade Journal*.)

The Agricultural Superintendent at St. Vincent estimates that there are 20,040 good bearing plants of the Chinese banana (*Musa Cavendishii*) growing within easy reach of Kingstown, St. Vincent. The majority of these are being grown by the peasantry, who would probably themselves utilize a good proportion of the fruit. On the other hand, if suitable arrangements could be made for shipping, the cultivation could easily be extended.

In the *Tropical Agriculturist* for July 1905, the Ceylon Government Entomologist reports immense numbers of the cotton stainer (*Dysdercus cingulatus*) at the Government cotton experiment station at Maha-iluppalama, but states that very little damage has been done. It has been found that when the seed-cotton is exposed to the hot sun, the stainers leave the cotton, which is then in good condition for ginning.

The *West India Committee Circular* states that the judges at the Colonial Exhibition have now completed their awards. Four awards have been made to Jamaica for tobacco and cigars, a grand prize going to the Montpelier Cigar Co. for their 'Golofina' cigars. The West India Cigar and Cigarette Co., of Trinidad, also secured a gold medal. Three gold medals have been awarded for exhibits of molascuit.

Reference was made in the *Agricultural News* (Vol. IV, p. 300) to the failure of the attempts to grow cotton in Cuba owing to the ravages of the cotton boll weevil. It might be pointed out that, so far, this pest has not attacked cotton in the British West Indies. Its appearance in Cuba, however, makes it particularly desirable that all cotton seed imported for planting purposes should be thoroughly disinfected before use, as has been done in the case of all cotton imported through the Imperial Department of Agriculture.

CONCENTRATED LIME JUICE.

Ascertaining its Strength by Means of a Hydrometer.

The following is the substance of a paper on the above subject, prepared by Dr. Francis Watts for the Dominica Agricultural Society:—

In a previous paper submitted to the Agricultural Society of Dominica, and published in the *West Indian Bulletin*, Vol. V, pp. 236-40, I made suggestions for the use of a hydrometer for ascertaining approximately the strength of lime juice. In that paper it is stated that the hydrometer and the table may be used to ascertain approximately the strength of concentrated lime juice by carefully diluting the concentrated juice with water to ten times its volume. This may conveniently be done by accurately filling with concentrated juice a flask holding exactly 100 c.c., then transferring this juice to a flask holding 1,000 c.c. (1 litre), and filling up the 1,000-c.c. flask with water. The small flask must be carefully washed out with water used for diluting, so that all the concentrated juice measured in the 100-c.c. flask is transferred to the larger flask.

The hydrometer is floated in the diluted juice, the reading noted and multiplied by ten to give the strength of the concentrated juice.

Thus, if the hydrometer floats at 1.029 in the diluted juice, the strength is (approximately) 11.04 oz. per gallon, or, in the concentrated juice, 110.4 oz. per gallon.

It must be remembered that with anything but pure solutions the results are only approximately correct, but it is believed that they will be sufficiently accurate to be useful in ordinary estate practice.

Since the above was written I have had an opportunity of examining several samples of concentrated juice by the method stated, and of comparing the results with those obtained by titrating with alkali. It must be remembered that even titration by means of alkali does not accurately determine the true citric acid, but only the free acidity, which may be due in part to acids other than citric.

From this it appears that by means of the hydrometer and the table a planter can ascertain approximately the strength of the concentrated juice which he is producing, and can introduce into his work a measure of control which has hitherto been wanting.

What is necessary now is that the planters shall persist in the use of the citrometer in determining the point to which juice is to be concentrated, and then that each lot of concentrated juice shall be tested by means of the hydrometer, after diluting as described above. The indications of the hydrometer should then be compared with those of the citrometer ascertained during the process of concentration. Should the hydrometer indications be too high, the workman should be instructed to boil to a lower degree on the citrometer; should a higher concentration be wanted, he should be instructed to boil to a higher degree accordingly.

Very little care and observation on the part of the planter will enable him to concentrate to any point which he may fix upon as most desirable.

My observations led me to conclude that in the past there was a tendency in Dominica to concentrate to too high a degree; this was due to the impression that by concentrating, say, 12 to 1, instead of 8 to 1, there is a great saving of freight and packages. This is true in some degree, but high concentration is accompanied by destruction of citric acid. If the freight and packages of

a cask of concentrated juice cost, say, £2, and the juice be worth, say, £15, then a saving of one-third of the freight and packages will effect a saving of 13s. 4d.; a loss of 5 per cent. of acid will entail a loss of 15s., and a loss of 10 to 15 per cent. of acid may easily occur from over-concentration, entailing a loss of 30s. to 45s.

Moreover, I am informed that the purchaser of concentrated juice prefers to have his supplies concentrated to a moderate degree, concentration of from 95 to 100 oz. being preferred to that of 130 to 140 oz.

I can only repeat the advice which I have previously given (see *West Indian Bulletin*, Vol. II, p. 309): 'Carry on the concentration until the citrometer, when immersed in the juice at boiling temperature, shows a density of 60°.' The concentrated juice thus obtained will contain about 100 oz. of citric acid per gallon: if, on testing the resulting juice with the hydrometer in the manner described, it is found to be too highly concentrated, then a lower degree on the citrometer must be taken as the point to which to concentrate.

There will be variations in each district, so that the correct point can only be found by experiment.

With the combined use of the citrometer and the hydrometer the planters have the means of producing concentrated juice of a uniform quality, and of approximately learning its strength.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned from a visit to Grenada on Sunday, the 29th. ultimo. The Imperial Commissioner met the members of the Agricultural Experiments Committee at St. George's on Thursday, the 26th. ultimo, and a number of important subjects connected with local industries were discussed and advanced. A conference of Cotton Growers and of those interested in stock raising, arranged to be held at St. Vincent on Saturday the 28th. ultimo, did not take place owing to the C.L.S. 'Orinoco' being thirty-six hours late.

The Hon. Francis Watts, C.M.G., the Superintendent of Agriculture in the Leeward Islands, is expected to arrive at Barbados in the R.M.S. 'Esk' on the 8th. instant, in order to confer with the Imperial Commissioner in regard to the business of the Department.

COHUNE NUT PALM.

Reference is made elsewhere in these columns to attempts that have been made to obtain a machine suitable for extracting the kernels from nuts of the cohune palm in British Honduras.

These nuts are the produce of a majestic palm, known as *Attalea Cohune*, which is a native of Honduras. It resembles somewhat the cocoa-nut palm, but does not grow to so great a height and has much larger leaves and a thicker trunk.

The fruit is about the size of a large hen's egg, and is produced in clusters. The oil is said to be superior to cocoa-nut oil and to realize a considerably higher price.

It has often been suggested that a remunerative industry might be established in this product in British Honduras, but, so far, the obstacle has been the absence of a suitable machine for extracting the kernels from the hard-shelled nuts.

EDUCATIONAL.

Grenada.

The following is an extract from the Inspector of Schools' Report on Primary Education in Grenada for the year 1904, in which reference is made to teaching principles of agriculture in elementary schools:—

This subject continues to be taught in all the schools, with decidedly satisfactory results. The spirit exhibited on the first attempt to introduce the scientific teaching of this subject into the schools has now happily disappeared, although there still remains room for the display of active co-operation as between manager and teacher in a few solitary instances; and to-day, teachers have learnt to regard their schools as the agencies, and themselves the immediately responsible agents, through whom the introduction of this subject into the school curriculum, assisted by school gardens, is intended as the means of opening the eyes of the masses to the fact that Grenada is not a manufacturing but an agricultural community. The suspension of all active work in the Agricultural Department at the Botanic Station, through the vacancies in the offices of Curator and Agricultural Instructor, has acted as a check on the vigorous life that was in evidence a year ago, when the school gardens were laid out and enclosed. As soon as an Agricultural Instructor is appointed, the work of fencing in plots will again be proceeded with.

At the close of 1904, the following school gardens were in full working order, and had been so for the whole year:—

St. Paul's Anglican—Manager, Revd. G. W. Branch.

„ „ Rom. Cath. „ „ Fr. Gurrin.

„ George's Boys' R.C. „ „ „ „

„ John's R.C. „ „ Fr. Tigar.

„ Mark's Anglican „ „ Canon Arthur.

In connexion with work on the practical side, the teachers were awarded sums amounting to £13 as lump-sum bonuses on the result of the examinations held in October and November last.

Nearly every one of these schools had had several sales of garden produce during the year, the proceeds of which were employed by the teachers, with their manager's permission, in giving school treats by way of encouragement, and in improving the gardens. Samples of garden produce were from time to time sent to the Department and submitted for the inspection of his Excellency the President, who encouragingly had the receipt of them acknowledged. One school secured prizes at the Agricultural Society's Exhibition held in the month of March this year.

Trinidad.

The following are extracts from the Annual Report of the Inspector of Schools in Trinidad, in which reference is made to the teaching of the principles of agriculture and school garden shows:—

During the year 1904-5, 190 schools were examined in practical agriculture, fifty-four of these being successful in obtaining the highest award—'Very good.' In the previous year, of the 180 schools examined only thirty obtained the highest award, so that a clear note of progress has been sounded in this direction. And while it is admitted that the production of vegetables for the annual shows seems to be the sole aim in some of the schools, it is only fair to state that there are not a few teachers who show, by their intelligent methods of teaching agriculture, and by the assiduous cultivation in their pupils of habits of observation,

both in and out of school, that they are aiming at a far higher ideal. The Assistant Inspectors gratefully acknowledge the valuable help afforded by the visits of the Agricultural Instructors, and I wish it were possible for these officers to devote more time to this part of their work. Throughout the year weekly lectures have been given by one of them at the Government Training School, Port-of-Spain, and at the Presbyterian Training School, San Fernando, the students of Nelson Street Roman Catholic Training School also attending at the former. The bi-weekly chemistry lectures at the Government Training School were conducted as in the previous year by Mr. A. E. Collens, of the Government Analyst's Department. In future, however, these lectures will be given at the Government Laboratory, which affords better facilities for experimental work.

SCHOOL GARDEN SHOWS.

The exhibits of vegetables and vegetable products were a distinct advance upon those of previous years in regard to both quantity and quality, and, judging from the crowds who turned out to see the shows, a spreading interest is being taken in what is now looked forward to as the function of the year at each centre. A new departure was made last year by the inauguration of a section at all the centres comprising exhibits of local cultivators (apart from schools). The prizes for these were contributed to the extent of £50 by the Agricultural Society, with an additional £25 raised by subscription. The fact of their being two separate sections, one exclusively for schools, and the other for the general public served to create a healthy rivalry and to add to the popularity of the shows. It is not unreasonable to believe that these annual exhibitions, though on a comparatively humble scale, will help in no small degree to develop the great natural resources of the colony, and they prove beyond a doubt that many of the necessities of everyday life can be produced at our own doors with little trouble or expense.

AGRICULTURE IN BRITISH HONDURAS.

The *Annual Report* on British Honduras for 1904 has the following note on new industries of the colony:—

Several cacao plantations are now established in the colony, and some are producing good crops. Whereas, a few years ago, cacao was imported from London to supply local requirements, it is satisfactory to note that during 1904 British Honduras was not only able to satisfy home demands but to export the produce. Several banana growers have taken up the cultivation of cacao.

In parts of the colony the soil is well adapted for the production of coffee. The industry, however, is still undeveloped. A plantation in the Toledo district is the only one of any pretensions. The planters of Mullins River cultivate small patches of the product for their own use.

There is plenty of land in the colony capable of producing good tobacco, but only a comparatively few people in the northern districts pay any attention to its cultivation; the little produced is consumed locally.

Further efforts were made during 1904 to establish a cotton industry. Two of the largest landowners in the north cleared and prepared about 40 acres of land for the purpose of growing cotton, and some seed was planted. The results were not satisfactory. Most of the seed failed to grow, and those plants which did well were damaged by excessive rains. Maize is produced plentifully wherever an Indian population is settled. It is their main article of diet

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of September has been received from Mr. J. R. Jackson, A.L.S.:—

In reviewing the market in drugs and spices during the month of September, it is satisfactory to be able to report a general upward tendency, though there was some inclination to decline before the end of the month. With regard to West Indian produce, the scarcity that has prevailed for some time in grey Jamaica sarsaparilla continues, and there is also a scarcity in West Indian tamarinds, both of which are held at advanced prices. The following is a summary of the position of West Indian products during the month:—

GINGER.

At the first auction, 140 packages of Jamaica were offered and 37 disposed of at 44s. to 47s. for fair washed, and 42s. for good common in small bags.

On the 20th., some 150 packages of Jamaica were offered, part of which only was disposed of at rates from 42s. 6d. to 44s. for part common. At the same sale 50 bags of medium and small wormy washed Cochin were sold at from 18s. 6d. to 19s. At the close of the month, the prices for Jamaica stood as follows: good, 56s.; fair washed, 44s. 6d. to 48s.; and good common, 42s. to 43s.; while wormy washed Cochin was partly sold at 19s. to 20s., limed Japan being bought in at 16s. per cwt.

NUTMEGS, MACE, AND PIMENTO.

Throughout the month, nutmegs continued very quiet, improving slightly towards the end; the same may also be said of mace, the quotations for which at the sale on the 20th. were: good West Indian, 1s. 4d. to 1s. 7d.; fair, 1s. 2d. to 1s. 3d., and pickings, 1s. to 1s. 1d. Fine Penang was bought in at this sale at 2s. 6d. Pimento varied but little throughout the month, the quotations being 2½d. to 2¾d. per lb.

ARROWROOT.

At the auction on the 13th., arrowroot was in steady demand, 286 barrels were offered, most of which was sold at rates from 1½d. to 1¾d. per lb. for middling to good manufacturing St. Vincent. A week later the same quality was offered and bought in at 2d. per lb.

SARSAPARILLA.

At the first auction, on the 7th., there were no arrivals of grey Jamaica, but 1s. 3d. was quoted for Lima-Jamaica. A week later 5 bales of native Jamaica only were offered, 8d. being paid for 1 bale of middling reddish and yellow, and 6½d. to 7d. for sea-damaged. At the last auction, 8 bales of grey Jamaica were offered; fair sound realizing 1s. 6d.; slightly sea-damaged fetching the same price, and sea-damaged, 1s. 5d. per lb. One bale of good red native Jamaica sold at 10d., and 4 bales of pale-yellow to reddish, realized 8d. per lb.

TAMARINDS, KOLA NUTS, AND OIL OF LIMES.

Tamarinds were quoted at much higher rates, 18s. per cwt. being asked for Barbados, 16s. for Antigua, and 13s. for common dark, duty paid. Twenty-five barrels of West Indian kola nuts were offered at the sale on the 14th., realizing 4d. per lb. for dark whole and halves. At the same sale, 7 cases of dark Ceylon halves were disposed

of at the same rate. At the spice auction in the same week 25 baskets of green nuts were bought in at 3d. per lb. West Indian distilled oil of limes, offered in the middle of the month, fetched 1s. 8d. per lb.

CAPSICUMS.

With regard to the consignment of Nepaul peppers and red chillies, recently forwarded to London by the Imperial Commissioner of Agriculture, and referred to on p. 280 of this volume of the *Agricultural News*, it may be of interest to give the following quotations for chillies for the four weeks of the month. On the 6th., fine Nyassaland, 37s.; large Japan, 24s. per cwt. On the 13th., good bright red, East Coast of Africa, 33s. 6d. On the 20th., Mombasa chillies were bought in at from 28s. to 30s.; some fine bright small Mombasa Capsicum chillies, without stalks, 62s.; fine red Japanese chillies 24s. On the 27th., good bright Zanzibar and Mombasa, 28s. to 30s.

LIMA BEANS.

The *Agricultural Ledger*, 1905—No. 2, contains a report on the chemical examination of the seeds of the Lima bean (*Phaseolus lunatus*) by Professor Wyndham K. Dunstan, F.R.S., with introductory information with regard to the habitat, uses, and composition of the plant. As this plant is widely cultivated throughout the West Indies, the following brief abstract has been prepared:—

The Lima bean is said to be indigenous to South America, but it has long been cultivated in most of the warmer parts of the earth.

The legumes or pods are not used as an esculent. The ripe seeds are eaten, and they should be cooked in the same way as haricots or broad beans. Chemical analyses show that they contain 20 to 21 per cent. of albuminoids and 37 to 57 per cent. carbohydrates.

The white bean is apparently produced only by carefully cultivated plants. In other cases the colour of the testa is cream coloured, pink, or even purple coloured.

In Mauritius the plant is used as a green manure, and a number of cases in which cattle had been poisoned as the results of eating the plant have been recorded.

The poisonous action of the seed has been observed for many years, and fatal effects have often followed the consumption of the raw beans. Professor Dunstan's examination of the Mauritius beans showed that they yielded, when the beans were ground with water, from 0.04 to 0.09 per cent. of prussic acid, the largest amounts being found in the dark, purple-coloured seeds, and the smallest in those with an almost white testa.

A further examination of beans from Burma showed that, while these furnished less prussic acid than the Mauritius beans, there was still sufficient to render them undesirable for consumption.

It is urged that much harm would be done to the Indian trade in leguminous seeds for feeding stuffs, if consignments of poisonous beans were distributed. 'It seems advisable, therefore, that, if possible, the cultivators . . . should cultivate the perfectly white variety rather than the coloured varieties.'

[It is understood that when cooked Lima beans are a perfectly wholesome food. The above refers only to the consumption of Lima beans in the raw state as a food for animals. Ed. A. N.]

MARKET REPORTS.

London,—October 13, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 6, 1905; and 'THE PUBLIC LEDGER,' October 7, 1905.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 21/- to 60/- per cwt.
 ARROWROOT—St. Vincent, 1 $\frac{3}{4}$ d. per lb.
 BALATA—Sheet, 1/4 to 1/11; block, 1/3 to 1/4 per lb.
 BEES' WAX—£7 12s. 6d. to £8 per cwt.
 CACAO—Trinidad, 51/- to 54/- per cwt.; Grenada, 47/- to 51/- per cwt.
 CARDAMOMS—Mysore, 7 $\frac{1}{2}$ d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.
 COTTON—West Indian, medium fine, 6'00d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15 $\frac{1}{2}$ d. per lb.
 FRUIT—
 BANANAS—Jamaica, 5/- to 6/- per bunch.
 GRAPE FRUIT—11/- to 13/- per box.
 LIMES—4/6 to 6/- per box.
 ORANGES—Jamaica, 9/- to 11/- per box of 176-200.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, low middling to middling, 43/- to 48/- per cwt.
 HONEY—16/6 to 24/- per cwt.
 ISINGLASS—West Indian lump, 2/- to 2/7; cake, 1/3 to 1/4 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 10s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/7 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair pale, 1/4 to 1/5; dark to fair red, 1/1 to 1/3; broken, 1/- per lb.
 NITRATE OF SODA—Agricultural, £10 15s. per ton.
 NUTMEGS—57's, 2/2; 70's, 1/3; 82's, 10d.; 92's, 8 $\frac{1}{2}$ d.; 100's, 6d.; 144's, 5d. and in shell at 4 $\frac{1}{4}$ d. per lb.
 PIMENTO—Fair, 2 $\frac{9}{16}$ d. per lb.
 RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.
 SUGAR—Yellow crystals, 16/6 to 18/- per cwt.; Muscovado, 15/- to 16/- per cwt.; Molasses, 12/- to 15/- per cwt.
 SULPHATE OF AMMONIA—£12 13s. 9d. per ton.

Montreal,—September 11, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$23.00 to \$25.00; Trinidad, \$20.00 to \$21.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7 $\frac{1}{2}$ c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.00 per 100 lb.
 MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 18c. per lb.
 ORANGES—Jamaica \$5.50 per barrel, duty paid.
 PIMENTO—Jamaica, 5 $\frac{1}{4}$ c. per lb.
 SUGAR—Grey crystals, 96°, \$2.25 to \$2.40 per 100 lb.
 —Muscovados, 89°, \$1.75 to \$1.90 per 100 lb.
 —Molasses, 89°, \$1.50 to \$1.65 per 100 lb.
 —Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—October 13, 1905.—Messrs. GILLESPIE BROS. & Co.

BEES' WAX—30 $\frac{1}{2}$ c. to 31c. per lb.
 CACAO—Caracas, 11 $\frac{1}{2}$ c. to 12c.; Grenada, 11c. to 11 $\frac{1}{4}$ c.; Trinidad, 11 $\frac{1}{4}$ c. to 11 $\frac{3}{4}$ c.; Jamaica, 9 $\frac{1}{2}$ c. per lb.
 COCOA-NUTS—Jamaica, and Trinidad, \$28.00 to \$30.00 per M.
 COFFEE—Jamaica ordinary, 8 $\frac{1}{4}$ c. to 11 $\frac{1}{2}$ c.

GINGER—Jamaica, 8c. to 9c. per lb.
 GOAT SKINS—Jamaica, 56c.; West Indian, 49c. to 50c. per lb.
 GRAPE FRUIT—Jamaica, \$5.00 to \$7.50 per barrel; \$2.00 to \$4.00 per box.
 HONEY—Jamaica, 63c. to 64c. per gallon (duty paid).
 LIMES—\$7.00 to \$8.00 per barrel.
 MACE—28c. to 31c. per lb.
 NUTMEGS—West Indian, 80's, 21c. to 22c.; 110's, 13 $\frac{1}{2}$ c. to 120's 10c. to 11c. per lb.
 ORANGES—Jamaica, \$3.75 to \$4.50 per barrel.
 PIMENTO—4 $\frac{3}{4}$ c. per lb.
 PINE-APPLES—4c. to 10c. each.
 SUGAR—Centrifugals, 96°, 3 $\frac{5}{8}$ c.; Muscovados, 89°, 3c.; Molasses, 89°, 2 $\frac{3}{4}$ c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—October 23, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

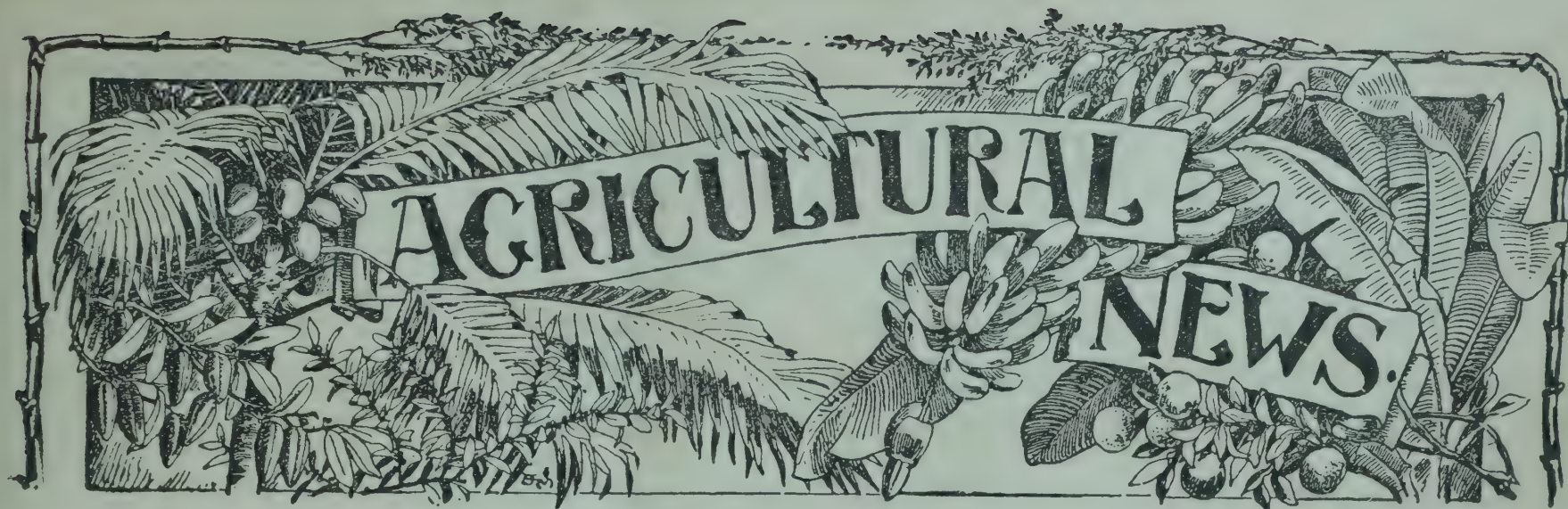
ARROWROOT—St. Vincent, \$4.50 per 100 lb.
 CACAO—\$10.00 to \$11.00 per 100 lb.
 COCOA-NUTS—\$14.00 per M. for husked nuts.
 COFFEE—\$10.50 to \$11.00 per 100 lb.
 HAY—95c. to \$1.00 per 100 lb.
 MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 ONIONS—Madeira, \$4.00 per 100 lb.
 POTATOS, ENGLISH—Nova Scotia, \$3.00 to \$3.60 per 160 lb.
 RICE—Ballam, \$4.20 to \$4.75 per bag (190 lb.); Patna, \$2.86 to \$3.20; Seeta, \$3.10 to \$3.26; Rangoon, \$2.50 to \$2.55 per 100 lb.

British Guiana,—October 22, 1905.—Messrs. WIETIN & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
 CACAO—Native, 14c. per lb.
 CASSAVA STARCH—\$5.50 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—Creole, 14c. per lb.
 DHAL—\$3.90 per bag of 168 lb.
 EDDOES—72c. to 88c. per barrel.
 ONIONS—Tenerife, 1 $\frac{1}{2}$ c. to 2c.; Madeira, 3c. to 4c. per lb.
 PLANTAINS—12c. to 32c. per bunch.
 POTATOS, ENGLISH—1c. to 1 $\frac{1}{4}$ c. per lb. retail.
 POTATOS, SWEET—Barbados, 80c. per bag.
 RICE—Ballam, \$4.30 to \$4.40 per 177 lb.; Creole, \$4.10 to \$4.20 per bag. (ex store).
 SPLIT PEAS—\$5.90 to \$6.00 per bag (210 lb.).
 TANNIAS—\$1.44 per barrel.
 YAMS—White, \$2.16; Buck, \$1.92 per bag.
 SUGAR—Dark crystals, \$1.85 to \$2.10; Yellow, \$2.75 to \$2.80; White, \$4.00 to \$4.10; Molasses, \$2.00 to \$2.10 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—October 23, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.50; estates, \$11.25 to \$11.75 per fanega (110 lb.); Venezuelan, \$11.25 to \$11.60 per fanega.
 COCOA-NUTS—\$21.00 per M., f o b
 COCOA-NUT OIL—67c. per Imperial gallon (casks included).
 COPRA—\$2.95 to \$3.00 per 100 lb.
 DAHL—\$3.20 to \$3.25 per bag.
 ONIONS—Stringed, \$1.80 to \$2.25 per 100 lb. (retail).
 POTATOS, ENGLISH—90c. to \$1.00 per 100 lb.
 RICE—Yellow, \$4.25 to \$4.60; White, \$4.50 to \$5.60 per bag.
 SPLIT PEAS—\$5.20 per bag.
 SUGAR—White crystals, \$4.00 to \$4.50; Yellow crystals, \$2.75 to \$3.00 per 100 lb.



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Barbados Banana Industry.

ON November 13 a deputation of banana growers at Barbados was received by Mr. Owen Philipps, the Chairman of the Royal Mail Steam Packet Company, for the purpose

of expressing their views in connexion with the shipment of bananas to the United Kingdom.

The Hon. Sir Daniel Morris, K.C.M.G., briefly introduced the deputation and invited the Hon. F. J. Clarke, the Chairman of the deputation, to lay before Mr. Philipps the present position as affecting the banana growers.

Mr. F. J. Clarke stated that the deputation desired to place before the Chairman of the Royal Mail Company certain points in connexion with the shipment of bananas from Barbados. The total shipments for the year, so far, were something like 40,000 bunches, which showed that the banana industry was increasing and full of promise. Under favourable circumstances next year the shipments might reach 100,000 bunches.

Great difficulty had been experienced, in the early stages of the industry, owing to the fact that, during the summer months, with the conditions then existing on the Royal Mail steamers, the bananas were frequently spoiled in transit. The company had been good enough, on the suggestion of the Imperial Commissioner of Agriculture, to install the Hall's cold-storage system on the 'Trent' and 'Tagus.' Recently the 'Orinoco' had been similarly fitted, and they understood that the installation of a fruit chamber had been commenced on the 'Atrato.' The 'La Plata' had no accommodation whatever for carrying fruit. This meant that planters had lost, and were steadily losing, money by their shipments of bananas in the latter vessel.

In consequence, shippers endeavoured to send as many bunches as they could by the 'Tagus' and 'Trent' and now also by the 'Orinoco,' because they were fitted with cold-storage chambers. If, however, owing to the fact that the Royal Mail Company was directly interested in the new fruit industry at Trinidad, the steamers came to Barbados with their cool chambers more or less filled, the result would be that Barbados fruit would be shut out, and if placed in ordinary holds the fruit would spoil. The growers had perseveringly worked up the industry for three years, they selected and packed the fruit with great care, and they were certain that, with suitable transport accommodation, it would prove a paying one. Failing an assurance from the Chairman that the company would set apart a definite amount of space for Barbados bananas, they desired to know whether the British West Indian Fruit Co., Ltd., would be prepared to buy the bananas locally, and at what price.

In replying, Mr. Owen Philipps expressed his pleasure at meeting so representative a gathering of banana growers. He said that the matters that had been laid before him would receive the consideration that such weighty representations deserved. The space available on the mail steamers for carrying bananas was limited. It was, therefore, the company's intention, while utilizing some of the space for fruit from Trinidad and some of the other islands, to afford Barbados as large a share as possible.

With regard to the rumour mentioned by Mr. Clarke that the transatlantic passenger steamers might cease to call at Barbados, Mr. Philipps assured the deputation that such a matter had never been under consideration. The British West Indian Fruit Co., Ltd., which was a subsidiary company of the Royal Mail Steam Packet Co., did not intend to limit its operations to Trinidad, and it would be prepared to consider proposals for handling the fruit from Barbados. He thought the most satisfactory way would be for the company to lay before the deputation definite proposals, for communication to the growers, who could then consider the suggestions and see whether arrangements could be arrived at satisfactory to both parties.

The Royal Mail Co. was prepared at once to fit Hall's cold-storage system on the remaining mail steamers and on three of the new cargo boats within about six months or less. In each of the latter they would provide from 1,000 to 1,500 tons of refrigerated space. He repeated his promise to reserve a fair amount of accommodation on the present mail

steamers for Barbados fruit, but what the exact amount of space would be, he could not state until he had had an opportunity of going fully into the matter.

In reply to a vote of thanks for his courtesy in discussing with the deputation the points put forward, Mr. Philipps said it had given him much pleasure to meet the deputation, as it was important that every advantage should be taken of opportunities for discussing and removing difficulties. The banana industry at Barbados, he was convinced, was one that could be carried on profitably.



SUGAR INDUSTRY.

Fiji.

The following information in regard to the sugar industry in Fiji is extracted from an article in the *International Sugar Journal*:—

Great improvements have been effected in the Fiji mills, and most of them have been rebuilt several times over to keep their machinery up-to-date, and the whole generally in the line of progress. The addition of two extra rollers to the three in use in the first mills, and the substitution of the nine-roller mill for the latter, effected an approximate saving of 20 per cent. in juice extraction. More recently still, twelve-roller mills have been installed, and improved chopping and shredding apparatus and hot water maceration have also cut off substantial losses.

If the methods of growing in vogue in the Fiji sugar fields were as advanced as those of milling, the industry would be an infinitely more lucrative one. As it is, the acreage productions and the net profit per acre are but a fraction of those obtained in Hawaii, in spite of the fact that the planters of the latter islands pay three and four times as much for labour no more efficient than that employed by the Fijian planter. With far more surface water to draw from, and with coal much cheaper for pumping, should that be necessary, irrigation in Fiji, as compared with Hawaii, is but little practised. Nor has scientific fertilization in Fiji been brought to the point it should have. Hence it is that her planters have had, so far, to content themselves with a maximum acreage production barely in excess of 3 tons, the value of which, say, £50, is £10 less than the average sum expended on each acre of one of the big Hawaiian plantations for fertilization and irrigation alone. How well this latter expenditure is justified is shown by the fact that the average acreage production of the plantation in question is 10½ tons, with a maximum production of 16 tons to the acre on the best land.

In Fiji the custom of 'ratooning' (leaving the field to a volunteer growth from the old root) for a number of successive seasons—a procedure also in vogue in Queensland—is not in line with the best Hawaiian practice. There, if a 'ratoon' field is not deemed capable of producing 30 tons of cane (the equivalent of 3 or 4 tons of sugar) to the acre, it is torn up, and 'plant' set out. This is more expensive of course, but it has been justified by its success.

SUGAR-CANE EXPERIMENTS AT BARBADOS.

At a meeting of the Barbados Agricultural Society held on November 3, Mr. J. R. Bovell, F.L.S., F.C.S., read a paper on the results of the experiments with sugar-cane carried on at Barbados under the direction of the Imperial Department of Agriculture during the season 1903-5. The experiments consisted of two series, (1) experiments with seedling and other canes, and (2) manurial experiments.

The following is a brief summary of the portion of Mr. Bovell's paper dealing with the experiments with varieties:—

In selecting seedling canes the most important characters are taken into consideration in determining their value. With regard to the field characters, these are: (1) germinating power, (2) behaviour under extremes of dryness and moisture, (3) habit of the cane, that is, whether upright or recumbent, (4) power of resisting the attacks of insects and fungi, (5) period of growth, (6) productive power, (7) weight of tops per acre, (8) ratooning power; there are also the factory characters, viz., (9) milling quality, that is, whether the canes are tough or brittle, (10) fuel-producing property, depending on the percentage of fibre in the cane, (11) relative percentage of expressible juice, that is, the juiciness or dryness of the cane, (12) the richness of the juice, (13) the purity of the juice.

The rainfall in December 1903 and January 1904 being good, the cane cuttings, on the whole, germinated regularly, and an excellent stand was obtained at an early time. During what is usually the dry season, that is, from February to the end of May, showery weather was experienced and when the rainy season set in at the beginning of June, the canes were in such a condition as to benefit readily by the rain. As the weather was favourable they made considerable progress during June, July, August, and September, but in October a drought set in, and from then until January, the rainfall was much below the average. January was, on the whole, fairly showery, but from then until the end of the reaping season practically little rain fell. In spite, however, of the limited rainfall during the last three months of 1904, the canes continued to grow, due, probably, to the fact that the soil had been thoroughly saturated at an early time, consequently the crop was not much below the average. The effect of the dry weather, however, seemed, to some extent, to increase the root disease, and he regretted to say that in many of the cane experiment plots the canes were attacked by this disease.

Among the plant canes on both black- and red-soil estates, B. 1,529 had given the best results in the season under review. On the average, in the two districts, it gave 1,603 lb. of saccharose per acre more than the White Transparent. In the black soils the yield as plant canes was 1,749 lb. more, on the average, than that of the White Transparent, and on red soils 1,439 lb. As ratoons, however, on the black soils it gave, on the average, 693 lb., and on the red soils 597 lb., less than the White Transparent.

The next cane which gave the best results on both black and red soils was B. 208; B. 379 came next, and then B. 376; the White Transparent came fifth.

To compare the canes just mentioned with one another on both black- and red-soil estates as regards the pounds of saccharose per acre, stated in terms of money at the average price at which sugar and molasses sold this year,

and assuming that 80 per cent. of saccharose was recovered as merchantable sugar together with its molasses: B. 1,529 had, on the average, given 7,402 lb. of saccharose per acre, B. 208, 6,744 lb. per acre, and the White Transparent, 5,799 lb. per acre. B. 1,529 had thus given a yield of nearly 28 per cent., and B. 208, 16 per cent. more than the White Transparent. To express this in money value, B. 1,529 had given \$26.41 per acre, and B. 208, \$15.57 per acre, more than the White Transparent. In the case of ratoons, on eight estates (six in the black soils and two in the red soils), B. 208 had given \$2.58 more than the White Transparent, but, on the other hand, B. 1,529 gave \$14.02 less. With plant canes on the black-soil estates, B. 147 gave 1,939 lb. of saccharose, B. 1,529, 1,749 lb. saccharose, B. 208, 711 lb. saccharose per acre, more than the White Transparent. Expressed in money value, the return from B. 147 was \$31.95, B. 1,529, \$28.82, and B. 208, \$11.71 per acre more than the White Transparent. Another cane of promise, of which the cultivation had been extended on a few estates in the black soils, was B. 376, the average of this cane in the black soils being \$3.93 per acre more than the White Transparent. With regard to first ratoons, of those in the black soils, B. 208 gave \$8.18 more per acre than the White Transparent, but B. 376 gave \$5.23, and B. 1,529, \$11.42 less than the White Transparent. As plant canes, on the average on three estates in the red soils, B. 208 gave sugar to the value of \$32.32, B. 1,529, \$23.71, and B. 376, \$10.31 more than the White Transparent, but, on the other hand, as first ratoons on two estates in the red soils, the White Transparent gave \$16.27 more than B. 208, \$2.85 more than B. 376, and \$8.85 more than B. 1,529. With regard to the White Transparent as first ratoons in the red soils giving sugar to the value of \$16.27 more than B. 208, it may not be without interest to state that the monetary return from the ratoons of the White Transparent, if deducted from the monetary return of the sugar from the plants of B. 208 would still leave, on the average, a profit of \$16.05 for the two years, or \$8.02 per acre per annum.

Taking the average for the past two seasons, the White Transparent came out eightieth on the list, and the planters' old friend, the Bourbon, still lower with 1,684 lb. of saccharose per acre, even less than the White Transparent.

Mr. Bovell called attention to new canes like B. 1,753, which had given saccharose at the rate of 11,516 lb. per acre, B. 3,289 at the rate of 10,705 lb. per acre, B. 1,030 at the rate of 10,485 lb. per acre, B. 1,355 at the rate of 10,302 lb. per acre, B. 6,048 at the rate of 10,102 lb. per acre, B. 3,696 at the rate of 9,828 lb. per acre, while the White Transparent for the same two years had given 6,452 lb. of saccharose per acre. The glucose per gallon of these canes was also satisfactory, the lowest, in the case of B. 1,030, being .044 lb. per gallon with 2.015 lb. saccharose per gallon, and B. 1,753 contained .055 lb. glucose per gallon with 1.968 lb. of saccharose per gallon, while the White Transparent contained .083 lb. glucose per gallon with 1.903 lb. saccharose per gallon.

Referring to B. 147, Mr. Bovell stated that on one estate this cane, as plant cane, had given 320 lb. per acre of merchantable sugar more than the White Transparent. On the same estate there had been reaped as ratoons for the past two years an average of 44 acres of B. 147, and this cane had given 599 lb. more saccharose per acre than the White Transparent.



WEST INDIAN FRUIT.

MANGOS IN ENGLAND.

As already stated in the *Agricultural News* (Vol. IV, p. 196), some of the Trinidad mangos sent to the Colonial Exhibition were forwarded to His Majesty the King. It is stated in the *Trinidad Bulletin of Miscellaneous Information* that smaller lots were also sent to Sir William Thiselton-Dyer, K.C.M.G., and the late Mr. Thomas Christy, who have testified to the excellent condition of the fruit.

Similar fruits were sent to Messrs. Monro, of Covent Garden Market, and reported upon as having no market value, 'as those really appreciating good qualities of the mango are few and far between.'

The Editor of the *Bulletin* therefore suggests that efforts be made to make mangos better known in Great Britain. 'Once known, a market, and a good market too, will assuredly open.' While it is impossible for Trinidad to maintain, at the present time, a constant supply, it is thought that in a short time, judging by the large numbers of grafted plants bought annually at the Experiment Station, the supply of the market in mangos will eventually be feasible.

CHINESE BANANAS AT GRENADA.

The following extract from a letter from the Agricultural Superintendent, Grenada, to the Imperial Commissioner of Agriculture deals with the number of Chinese banana plants in the island of Grenada:—

I have the honour to inform you that, in accordance with your wishes, I have made, to the best of my ability at such short notice, a census of Chinese banana plants in this island. As a result, I estimate that there are 30,000 plants in the island at least, and the Agricultural Instructor agrees with me in thinking that this is an under-estimate rather than an over-estimate.

In St. George's and St. Patrick's, where there are Barbadian settlements, the Chinese is the usual banana planted by the peasants, and Mr. Nixon, at Annandale estate, claims to have in his neighbourhood 15,000 plants, which you will note is half the total number in the island.

Parish.	Number of Plants.			
St. George	17,550
St. Paul	3,330
St. David	1,900
St. John	1,700
St. Patrick	4,950
St. Mark	500
St. Andrew	
Total	29,930

CANDIED CITRONS.

Under the title of 'How to make commercial candied citron,' the *Journal of the Jamaica Agricultural Society* gives the following recipe:—

Cut the fruit into halves or quarters, according to its size, put it in a tub or cask of brine, having first cleaned out the pulp, and leave it for a month, then renew the salt water, and let the citron lie in it for four or five months, or as long as you choose; this long process is necessary to eliminate the bitter principle from the rind, which it is otherwise impossible to remove entirely.

Next boil the fruit in fresh water until a fork will easily pass through it; it usually takes about an hour and a half to reach this point. Then put it in cold fresh water, to remain there for at least twenty-four hours, when it will have turned to that light-green colour which we have learned to associate with candied citron.

The next step is to drain the fruit, place it in earthen jars and pour over it hot syrup of white sugar of 20° saccharometer; cover it entirely, and let it stand for three weeks, but the syrup must be poured off twice a week, boiled, skimmed, and more sugar added each time until the syrup is a little thicker than it was at the first boiling; turn it back over the fruit at boiling point. The three weeks having elapsed, put the citron in a vessel containing the syrup with all the sugar it can dissolve; let it boil for ten minutes, and then for twenty-four hours keep it near the boiling point without letting it reach it, then boil it again until no more sugar can be taken up.

The proportion of sugar absorbed in this process is about 80 lb. to 100 lb. of citron rind. The boiling completed, the rinds are spread on wire netting and dried, either in the sun, or, which is a far superior method, in an evaporator.

Use of Bone Meal. The use of bone meal is made very difficult owing to its slow solubility. By means of an invention (German patent) of Dr. E. Meusel, in Liegnitz, the bone meal can be made into an iron preparation which will make it more soluble, as is the case with Thomas slag. The invention has as its basis the fact that phosphate of lime with solutions of chloride, sulphate, or nitrate of iron changes into phosphate of iron, with the formation of chloride, phosphate or nitrate of calcium. Then there is added a concentrated solution of an iron oxide salt. In a little while the mass becomes solid. The resulting nitrate or chloride of calcium is washed out with preparations of chlorides or nitrates. The finely pulverized phosphate is very easily soluble in slightly acid solutions and also in certain salt solutions. (*U. S. Monthly Consular Reports* for July.)

GRAPE FRUIT AND SHADDOCKS.

The latest issue of the *West Indian Bulletin* (Vol. VI, no. 3) contains an article on grape fruit and shaddocks, composed of popular notes written for several journals by Sir Daniel Morris in 1896 and 1897. The following summary of this article is likely to be of interest:—

There is little doubt that much confusion exists as to what is really grape fruit as distinct from the allied citrus fruits passing under such names as pumelow (invariably spelled pomelo in the United States), shaddock, forbidden fruit, paradise fruit, and others. These fruits are all, or nearly all, larger than the largest orange, and they are uniformly of a pale-yellow colour. In texture the rind may

be smooth or even polished. It is seldom rough, nearly always firm and not very thick. The pulp is pale-yellow or greenish-white, sometimes pink or crimson. The juice bags of the pulp are more distinct than in the orange; very juicy, somewhat sweetish, with a distinct, but agreeable, bitter flavour. In shape these fruits vary a good deal. Some are quite globular, others somewhat flattened at the top and tapering below, forming a pear-shaped body.

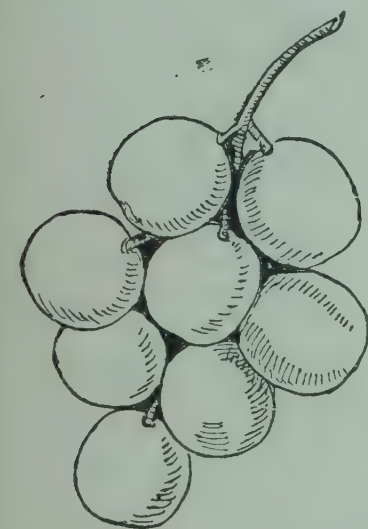


FIG. 24. GRAPE FRUIT. (*Citrus decumana*). This is supposed to be a native of the islands of the Pacific. It was introduced into the West Indies from China about 150 years ago by Captain Shaddock, in compliment to whom, since that time, the fruit has always been known in this part of the world as shaddock. The term shaddock may be correctly applied to any of the larger members of the giant citrus. The word pumelow, so widely used in India and Ceylon, is supposed to be a contraction of *pomum melo*, the melon apple.

All the larger-fruited sorts may, then, be called either shaddocks or pumelows: these are merely the western and eastern names for the same thing and are perfectly interchangeable. There are two well-marked varieties, one being globose, with the flesh of a pale-pink colour, and the other pear-shaped, usually with a deep-pink or crimson pulp.

As regards the small-fruited sorts, these, according to Dr. James Macfadyen, the author of the *Flora of Jamaica*, may be either globose, when they are called forbidden fruit, or pear-shaped, when grape fruit (so called because the fruits grow in clusters like a bunch of grapes) is the older name. The name forbidden fruit (from a fancied connexion with the Garden of Eden) is tolerably old in the West Indies.

As usually happens, when a name has become familiar in commerce, it is eventually applied in a much wider sense than the original one. Thus, the term grape fruit has become so general that any moderately large fruit, provided the skin is pale-yellow, thin, and smooth, and the pulp of a delicate flavour, is designated by it. The fruit commonly called grape fruit in New York is really the forbidden fruit of the West Indies. The true grape fruit is pear-shaped, and, according to Macfadyen, when obtainable at its best, is preferable to the forbidden fruit. The latter are in great demand, and they are regarded as the most refreshing and wholesome of any of the citrus family.

The grape fruit is not a shaddock nor a pumelow. It is quite a distinct fruit and possesses exceptional merits. It is in great demand in America chiefly because it has been so highly recommended by the medical faculty for its valuable dietetic and tonic qualities. It is also very refreshing and is regarded as a specific for dyspepsia.

There are, doubtless, many inferior sorts of grape fruit. In fact, in the West Indies, the plants have been allowed to run almost wild. No care has been taken to select the best varieties, or to bud or graft them, so as to keep them uniformly at a high standard. There is no need to grow the thick-skinned and bitter sorts, and those with a dry, cottony pulp, while there are varieties, both of the apple-shaped and pear-shaped fruits, with a silky skin, full of juice, and of a most delightful flavour, with just enough bitter to give it piquancy and suggest its valuable tonic qualities.

STRAWBERRY CULTURE IN CUBA.

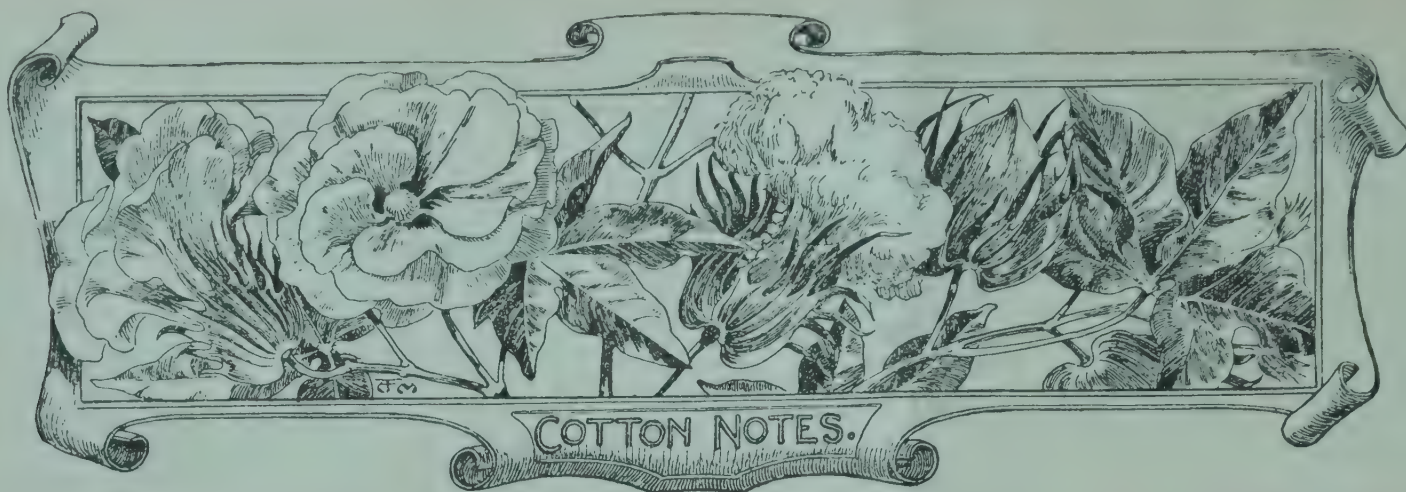
In an article in the *Agricultural News* (Vol. III, p. 55) reference was made to the cultivation of strawberries in the West Indies. It was mentioned that it had been proved possible to obtain crops of strawberries even at sea-level. In the following extract from the *U. S. Monthly Consular Reports* for June, a grower of these fruits in Cuba gives his experiences:—

When I started with my plants last fall, I had an old bed of 1,000 plants and several thousand runners which they had made. I set to work to prepare the ground very carefully for the runners, selecting a piece of the chocolate land, as it held moisture and seemed best suited. Former experience had shown me that the red land was too porous and the plants would be too dry. After the land was ploughed and harrowed several times in order to pulverize it as much as possible, I mixed in some good commercial fertilizer and let it lie for a time in order that it should get thoroughly mixed with the soil. Then I had the land carefully ridged up and on these ridges set the plants.

I had previously ordered a few thousand plants from the United States; but as these got through in bad condition, there was only a small part left to set with my own runners. Previous experience had taught me to expect more from the native runners than from any new plants ordered, so I kept working them carefully, resetting where they did not live, and finally had on my $\frac{3}{4}$ acre a fair stand.

In order to get this good stand I was very particular to protect the new-set plants in the rows by means of grass and palm leaves. As they commenced to grow and get accustomed to the change, the covering was gradually removed. In January 1905, they commenced to bear, but the bearers were mostly native runners and the plants in my old bed. They have continued to bear up to date, which is the fifth month. During a long, dry spell in the winter they were carefully watered and tended and fertilizer applied as needed. The expenses for them have been about as follows: Commercial fertilizer, \$108; labour, \$150; crates and baskets, \$45; express on fruit, \$80; total, \$403. The berries found a ready market in Havana, selling for 30c. and 40c. per quart. Up to date I have sold \$1,000 worth of berries, with a net profit of \$597. This seems to be a fair return from the amount of money and labour expended.

I consider my old bed of greater value for the coming season than it has been in the past. The older plants are the better bearers, and I have picked as many as twenty-four berries from a single plant.



APPLYING PARIS GREEN TO COTTON.

The Agricultural Superintendent at St. Kitt's-Nevis writes to the Imperial Commissioner of Agriculture as follows in reference to the application of Paris green to cotton:—

On one or two estates some little damage has been done owing to the planters not following the advice of the Department in mixing the Paris green and lime in the proportions of 1 lb. to 6 lb. of lime, but using instead 1 lb. to 15, and 20 lb. of lime, which did not kill the worm. They all now see their mistake, and will, I am sure, use the right mixture in the future.

PICKING COTTON FULLY RIPE.

In a recent letter received by the Imperial Commissioner of Agriculture, Mr. E. Lomas Oliver (who takes the keenest interest in the success of West Indian cotton) writes, under date of October 24, as follows:—

Further to my letter of October 22, will you allow me, now that the picking season is coming on, to suggest that you impress once more the vital necessity of picking the cotton *fully ripe*. Last season showed a very great improvement in this respect, but there is still something left to be desired. I hope all overseers will specially watch their pickers in this respect. If they do, the greater brilliancy of West Indian cotton will ensure a preference being given to West Indian over South Carolina cotton.

SEA ISLAND COTTON PROSPECTS.

The following is a copy of a letter from Messrs. Wolstenholme & Holland, of Liverpool, England, to the Imperial Commissioner of Agriculture for the West Indies, dated October 19, 1905, in reference to the state of the Sea Island cotton market:—

A fair business has been done during the past month in Sea Island descriptions, and prices are well maintained.

The advices from America respecting the Sea Island crop state that in Florida prospects are unfavourable, owing to bad weather, and while reports are better from Georgia, it is likely that less cotton will be made. In Carolina it is not expected there will be much change from last year. Crop estimates range from 85,000 to 90,000 bales.

Georgias have been in good demand, and all offerings have been readily taken, about 10½ at 10½. Floridas have only been dealt in to a limited extent, owing to the small receipts. Carolinas are held for full prices.

We incline to think that present prices will be maintained for some time, as factors are not disposed to accept any material decline.

COTTON AT CARRIACOU.

The following letter from the Commissioner of Carriacou to the Imperial Commissioner of Agriculture, dated October 27, contains information as to the acreage in cotton in Carriacou:—

Owing to the late planting season this year I have not been able before to give you the information desired in your letter of June 19 last, with respect to the acreage of Sea Island and Marie Galante cotton planted at Carriacou for the crop of 1906. As all cotton fields are now well established, I can, with tolerable certainty, estimate the acreage of Sea Island cotton at 200 acres (of which about 60 acres belong to peasant landholders) and Marie Galante at 3,000 acres. The latter is entirely grown on the Metayer system.

The Sea Island cotton fields are all in vigorous growth and bolting freely; the yield should therefore be quite up to the average of other cotton-growing islands in the West Indies. It is, however, difficult to estimate the probable yield from the Marie Galante fields, as, except in the case of the government allottees, most of the trees are ten and twelve years old, from which a very small return of inferior, short-staple cotton is usually obtained.

SEA ISLAND COTTON SEED.

The following is extracted from an article in the *Cotton Trade Journal* of Savannah, Georgia, for May 13, 1905, relative to the sale of seed in the Sea Islands of South Carolina:—

A great deal has already been said concerning the movement by the Sea Island planters to stop the sale of seed to competitive growers. It is now authoritatively announced that a close corporation of all the planters on the islands has been formed to carry out the object in view.

Intelligent opinion in the Sea Island trade is entirely in sympathy with the island planters; they are considered justified in seeking to protect themselves. On many of the West India Islands it is found that Sea Island cotton of a quality and staple nearly, if not quite, up to 'Carolinas' can be grown, provided they can obtain 'Carolina' or 'Islands' seed.

It may, however, be mentioned that the West Indies are now practically independent of South Carolina in the matter of Sea Island cotton seed, as the selected seed produced in these colonies is as good as, if not better than, that raised in the Sea Islands themselves.

SCIENCE NOTES.

Monstera deliciosa.

The *Gardeners' Chronicle* mentions that fruits of *Monstera deliciosa* have been on sale at Covent Garden. 'We are informed that the fruits are from Portugal, and are sent in small boxes which realize 12s. to 18s. per box. They were labelled "Pine-tree fruits," possibly because the flavour of the fruit has some resemblance to that of the pine-apple.'

This plant, a native of Mexico, belongs to the same natural order as the tanners, viz., *Aroideae*. It has a climbing habit with aerial roots. The flower is surrounded by a deciduous spathe. The succulent fruits are edible and have a delicate flavour somewhat resembling that of the pine-apple.

Fruiting plants of *Monstera deliciosa* are to be seen in most of the West Indian Botanic Stations into which they were introduced many years ago.

Akee Trees.

It may be of interest to mention that the akee tree (*Blighia sapida*) is not of very common occurrence in Barbados and some of the other West India Islands. It is very abundant in Jamaica, where the fruit is a very popular article of diet; in fact, salt fish and akees form one of the most common breakfast dishes among all classes in that island. There is a prejudice against its use on account of some danger from poisoning. When, however, the fruit is properly and carefully prepared, there need be no fear on this account. It is considered probable that cases of poisoning have been due to eating decayed fruits.

The akee belongs to the natural order *Sapindaceae* and is a native of tropical West Africa. It is a small tree, reaching a height of about 30 feet. The fruit is fleshy, of a three-sided form, with a reddish-yellow colour, about 3 inches in length and 2 inches in width; when ripe it splits down the middle of each side, exposing three shining black seeds, which are partly covered with a white substance known as the aril. This is the edible portion of the fruit.

The tree was introduced into the West Indies from Africa by Captain Blyth.

ECONOMIC PLANTS IN BERMUDA.

Dr. N. L. Britton, Director of the New York Botanical Garden, contributes an interesting article to the garden's *Journal* on a visit to Bermuda in September. He makes the following reference to the cultivated plants of Bermuda and to the work of the Botanic Gardens:—

The exotic plants of Bermuda include a very great variety of species from tropical and sub-tropical lands, most of them growing luxuriantly and including many notable and instructive examples. This already great variety will doubtless be increased through the work of the recently established experimental garden, now under the able management of Mr. T. J. Harris, who brings to it, from his former duties in the Department of Public Gardens and Plantations of Jamaica, wide experience and critical knowledge of tropical agriculture and horticulture. The exportable products of the island, now mainly potatoes, onions, lily bulbs, and arrowroot, will be improved and their cultivation made more successful, and other elements will be added through scientific experimentation and suggestion.

AGRICULTURE IN THE STRAITS SETTLEMENTS.

The following notes on the agricultural industries of the Straits Settlements are contained in the *Annual Report* on the colony for 1904:—

In Singapore the area under cultivation of pine-apples continues to increase, and a good deal of old land, abandoned since the days of gambier cultivation, has now been put under pine-apples.

A few Para rubber estates were started recently in the island, but it is hardly likely that these will increase to any great extent, as there is not much land suited for this cultivation. In Province Wellesley and Malacca, however, there is a marked increase in rubber cultivation, and still more so in the Federated Malay States. The area under cultivation now in the peninsula is very large and the prepared rubber is in great demand by the home manufacturers, the best samples having taken the highest price ever paid in 1904, viz., 6s. 1½d. per lb. An extensive series of experiments was carried out last year in the Botanic Gardens to discover improved methods of tapping and preparing rubber. The indigo cultivation in Singapore has dwindled away considerably. In fact, only a few fields are left. Very few of the dyeing houses now remain.

Cocoa-nut plantations continue to flourish in Penang and Province Wellesley, where some additional hundreds of acres were put under cultivation in 1904. In Singapore also a small increase was observable, but several of the older small plantations have been abandoned chiefly because of the demand for building land.

The cultivation of pepper in Singapore has remained practically stationary. Citronella grass has increased a little. The cultivation of nutmegs and cloves in Penang was normal, but prices were adversely affected by large West Indian supplies. There has been a large increase in vegetable cultivation. The rice and fruit crops in Malacca were both good. Further attempts were made to grow cotton in the colony, but it does not seem to have been really successful anywhere, and is never likely to be an important product of this country. Reports as to the failure of the beet crops had a stimulating effect on the sugar industry of Province Wellesley and Perak, very remunerative prices being received towards the end of the year.

GRAFTING CACAO.

Mr. J. Jones, Curator of the Botanic Station at Dominica, has forwarded the following note in regard to experiments in grafting cacao:—

Mention was made in the *Agricultural News* (Vol. IV, p. 244) that the alligator cacao (*Theobroma pentagona*) had been grafted on stocks of the tiger cacao (*Theobroma bicolor*) at the Dominica Botanic Station.

The grafted plants were placed out under the usual conditions, but up to the present, four months after grafting, no growth has been recorded on any of the plants, neither is there likely to be any. I am sending one of the plants for you to note the curious development of what were formerly buds. It is evident that *Theobroma bicolor* is not suitable as a stock for *Theobroma pentagona* and possibly other commercial kinds of cacao.

At the same time as the above experiment was tried, shoots of *Theobroma pentagona* were grafted on stocks of *Theobroma Cacao*, forastero variety. These plants are making nice growth. The forastero variety will, I think, make good stock on which to graft the alligator cacao.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

VOL. IV. SATURDAY, NOVEMBER 25, 1905. No. 94.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue is devoted to the question of transport for bananas from Barbados to the United Kingdom.

A summary of the report on the experiments with the varieties of canes, carried out under the direction of the Imperial Department of Agriculture at Barbados during the season 1904-5, is published on p. 355.

A short article on grape fruit and shaddocks appears on p. 357. This is followed by a note on growing strawberries in Cuba.

Various notes of interest to cotton growers will be found on p. 358.

The insect notes on p. 362 deal with (1) the species of mosquitos commonly found in England, and (2) the matter of the search for the natural enemies of the fruit fly.

A very successful agricultural show was held at the Experiment Station, Tortola, Virgin Islands, on September 13 last. The full report of the show committee appears on p. 365.

The article on p. 366 contains full directions for forwarding specimens of diseased plants and insect pests for examination.

Mr. J. Russell Murray's usual monthly report on West Indian produce in Canada is published on p. 367.

Exports of the Cayman Islands.

It may be of interest to make brief mention of the principal articles of export from the Cayman Islands—a dependency of Jamaica.

The principal industry is turtle fishing. The exports of turtle and turtle products from the Grand Cayman during the year 1904 were of the value of £3,070. Cattle and horses (valued at £1,067) and thatch ropes (£351) were also shipped.

From the smaller Cayman Islands there were shipped 855,200 cocoa-nuts of the value of £2,570, and turtle and turtle products, £848.

Forwarding Diseased Plants and Insect Pests.

It is desired to draw the attention of those who may have occasion to forward diseased plants or specimens of insect pests for examination to the notes published on p. 366.

Specimens of vegetable matter should be forwarded in 30-per cent. spirit in a bottle or corked tube. Large specimens such as portions of trees, etc., should be sent in well-ventilated cases.

The manner in which insects should be forwarded will naturally depend upon the kind of specimens. Directions are given which will meet the different kinds.

In all cases it is desirable that all the available information as to the occurrence of the disease or pest, the nature of the damage done, etc., be forwarded at the same time.

West Indian Agricultural Conference, 1906.

Owing to the insuperable difficulties that have presented themselves in connexion with the proposal to hold the next West Indian Agricultural Conference at Jamaica, the idea has now been definitively abandoned. Nothing has yet been determined as to the possibility of holding the Conference in any of the other colonies.

The Royal Mail Steam Packet Company was good enough to offer the services of the R.M.S. 'Solent' to take the representatives to Jamaica while she was on duty as a tourist steamer; but this offer the Imperial Commissioner of Agriculture was not in a position to accept. On the first voyage of the 'Solent' the stay in Jamaica would be only three days, which would be too short. On the second voyage, the stay would be fifteen days, which would be too long, as it would require the representatives to be absent from their homes for nearly five weeks in all.

It is evident that under the time-table of the Royal Mail Company now in force, Jamaica is cut off from rapid communication with other parts of the West Indies. The voyage to Jamaica by Royal Mail steamers, by way of Trinidad and South and Central American ports, will now occupy ten days, as compared with six days to New York and twelve days to Southampton. Formerly, the voyage from Barbados to Jamaica took only four days. Further, owing to the fact that the homeward steamer leaves Kingston two days before the arrival of the outward steamer at that port, a reply by letter from Jamaica cannot be obtained in Barbados under about thirty-two days.

Wet and Dry Cacao.

An effort has been made in Trinidad to ascertain the amount of marketable or 'dry' cacao obtainable from a given weight of 'wet' cacao, that is, the fresh beans. The result of an experiment started at the River estate for this purpose is given in the *Bulletin of Miscellaneous Information* for October.

A picking of 11 barrels of wet cacao weighed 2,600 lb. when brought in. The loss during fermentation was 403 lb., or 15.15 per cent. The loss of weight in drying after fermentation was 1,195 lb., or 54.44 per cent. The total loss during drying and fermentation was therefore 1,598 lb., or 61.46 per cent.

As it is evident that results will vary with different seasons, further trials will be made so as to obtain a fairly good average.

It may be mentioned that in some islands 'wet' cacao is calculated to yield half its weight as 'dry' or cured cacao.

From similar experiments at the Dominica Botanic Station it was ascertained that in that island the loss was 58 per cent., or, in other words, that 'the return from 100 lb. of "wet" cacao cannot be placed higher than at 42 lb.' (See *Agricultural News*, Vol. III, p. 246.)

Soils of Montserrat.

A valuable paper on the above subject, prepared by the Hon. Francis Watts and Mr. H. A. Tempany, published in the *West Indian Bulletin* (Vol. VI, no. 3), contains information that is likely to be of considerable service to planters in Montserrat.

The results are given of the mechanical and chemical examination of soils from twelve typical localities. The value of this paper is enhanced by diagrams showing at a glance the mechanical composition of the coarse sample actually analysed.

Dr. Watts and Mr. Tempany conclude that 'the soils of Montserrat are, on the whole, fertile and easily worked; they are characterized by containing very small amounts of carbonate of lime, but, otherwise, they are not usually deficient in the elements of plant food.' It does not appear that artificial manures are at present necessary, except where ratoon sugar-canes are grown: in such cases some nitrogenous manure, such as nitrate of soda or sulphate of ammonia, will prove useful.

The mechanical examination shows that there is considerable variation in the texture of the soils; while some are sandy and easily worked, others are stiff and require care in working.

There is an abundance of land well adapted for the cultivation of limes, and the industry is capable of considerable extension. There are also large areas capable of producing Sea Island cotton, and it would appear that the industry is likely to become the principal one of the island.

In addition there are suitable tracts for the cultivation of cacao and rubber, and, provided wind-breaks are planted, the cultivation of such crops might be largely increased. Further, the ordinary provision crops and vegetables can be grown with advantage.

Cassava Trials in Jamaica.

In the *Agricultural News* (Vol. IV, p. 269) a note was published giving the results of experiments with cassava in Jamaica. In that case the plots were reaped after twelve months' growth. A further report, published in the *Bulletin of the Department of Agriculture*, contains a statement of the results after fifteen months' growth.

The increase in the yield of starch per acre, resulting from the three months' growth since the first results were obtained, is very considerable. In the case of the first nine on the list, this increase varies from 3,000 lb. to 5,000 lb., and the increased yield of tubers from 3½ to 6½ tons.

Dr. Cousins considers that the results indicate that the gross yield of starch obtainable in Jamaica is far beyond his previous estimate (see *Agricultural News*, Vol. III, p. 150). The 'Long-leaf Blue-bud' heads the list with 15½ tons of tubers and 12,857 lb. of starch per acre. 'Blue Top' comes second with an indicated starch yield of 9,733 lb. per acre.

West Indian Bulletin.

The papers in the latest issue of the *West Indian Bulletin* (Vol. VI, no. 3) include the following by the Hon. Francis Watts: Manurial Experiments with Cotton in the Leeward Islands; Manurial Experiments with Cacao at Dominica; and the Soils of Montserrat. A summary of the results of the manurial experiments with cotton has already appeared in the *Agricultural News* (Vol. IV, p. 263). The experiments with cacao at Dominica, which were carried out at the Botanic Station in association with Mr. J. Jones, the Curator, are of an important character. They show very clearly that 'proper care and manuring can be relied upon to give substantial increases in yield.' In the paper on Montserrat soils, the results are given of the mechanical and chemical analyses of twelve typical soils, the former being shown in diagrammatic form.

The next article is one on grape fruit and shad-docks. This is summarized elsewhere in this issue of the *Agricultural News*. It is followed by two papers relating to the culture of cacao in Ceylon. One deals with the experiments that are being carried out at the Government Experiment Station, and the other with the control of the 'canker' disease.

Of special interest at the present moment is the paper on the Bud-rot of the Cocoa-nut Palm. This disease is causing considerable anxiety all over the West Indies, and with the view of assisting in the efforts that are being made to control the disease, all the available information relating to it has been collected and reprinted. The bud-rot of cocoa-nuts appears to have been first noticed in British Guiana thirty years ago. Later it was reported as occurring in Jamaica and British Honduras. More recently, it has been studied in Cuba, Porto Rico, and Trinidad.

The concluding paper contains further notes on the Naudet Patent Process for extracting and purifying Cane Juice. The process was in operation last season in Trinidad and Porto Rico.



INSECT NOTES.

Bananas and Mosquitos.

Brief mention was made in the *Agricultural News*, Vol. IV, p. 316, of a discussion as to the possibility of the recent outbreaks of mosquitos in England being connected with the importation of bananas from South and Central American ports, and it was suggested that the matter might be readily settled by reference to entomological experts. This appears to have been done, and the following extract from a letter from Professor F. V. Theobald, of Wye, reprinted in the *Jamaica Gleaner* from the *New Orleans Picayune*, finally disposes of the matter:—

The neighbourhood of the docks down the Thames, in fact, the whole Thames Valley, is often subject to much annoyance by mosquitos. The chief culprit is the European *Granthamia dorsalis*, Meigen, several nearly related species of which occur in North America, West Indies, etc.

Jamaican and Central American species would not live here. Most of the banana traffic goes to Bristol. I have had mosquitos sent from near there (Avonmouth). They were *Culex morsitans*, Theobald, a species so far only known in England, Belgium, and Finland.

Most of the tales of foreign invasion of mosquitos are all nonsense—probably all are—at least, none have ever been shown to have occurred.

We have some twenty-three species of Culicidae in Great Britain. A few are found in North America, as well as Europe, but no Southern State or Central American or West Indian species occur or are likely to survive if they ever came over. Probably a few may come in ships, but die off. None have been recorded, however.

I have had here, in a glass house, the yellow fever mosquito (*Stegomyia fasciata*) from eggs sent by Dr. Finlay, but it will not live in the open. My genus *Stegomyia*, so far, does not occur in Britain.

Fruit Fly and its Natural Enemies.

In a recent number of the *Agricultural News* (Vol. IV, p. 124) a note appeared to the effect that the Entomologists of the Cape of Good Hope and Natal had been commissioned by their respective Governments to visit Brazil to investigate the fruit fly (*Ceratitis capitata*) and its parasites, and, if possible, to import into South Africa the parasites that were said to be such efficient checks on the pest in Brazil.

This investigation was undertaken as a result of the report of Mr. George Compere, who visited Brazil on behalf of the Government of Western Australia. Mr. Compere's report was to the effect that the fruit fly (*Ceratitis capitata*) occurred in Brazil, together with several other species of fruit flies, and that these were so well held in check by parasites and a predaceous beetle that fruit growers there were entirely unacquainted with the pests, and that fruits were practically exempt from their attacks.

Mr. Fuller's report was published in the *Natal Agricultural Journal* for May 26, 1905, and Mr. Lounsbury's

report in the *Agricultural Journal of the Cape of Good Hope* for September and October. These reports show that Messrs. Fuller and Lounsbury found the conditions in Brazil quite different from what Mr. Compere found the previous year. Not only does the fruit fly exist in Brazil, but it is a severe pest in many parts of that country, and Mr. Lounsbury decides that the investigations of Mr. Fuller and himself show that Mr. Compere greatly overestimated the efficiency of natural enemies as a check on the pest. Fruit growers are quite aware of the damage caused by the maggots in fruit, and in many of the markets of Brazil locally grown fruit of certain kinds is rarely offered for sale on this account.

Messrs. Fuller and Lounsbury did not succeed in rearing any parasites from *Ceratitis capitata*, but obtained specimens of a small, wasp-like parasite from another species of fruit fly (*Anastrepha fratercula*).

Arrangements have been made with persons residing in South America to carry on in other seasons investigations to show whether the parasites already found will actually attack *Ceratitis capitata*, and whether this pest is extensively parasitized by this or other natural enemy which will be likely to prove an efficient check upon it in South Africa.

The Staphylinid beetle, which was reported to be predaceous on the fruit fly, was not found by Messrs. Fuller and Lounsbury, but they were informed that it appeared in considerable numbers after their departure.

A note in the *Agricultural News* (Vol. IV, p. 202) states that the fruit fly (*Ceratitis capitata*) occurs as a pest in Bermuda and also in Jamaica, but is held in check in the latter place by its natural enemies, which are supposed to be the same, or nearly the same, as those in Brazil. The reports of Messrs. Fuller and Lounsbury, which show that they found several species of fruit flies in Brazil, and failed to find the natural enemies of *Ceratitis capitata*, indicate that possibly the fruit flies may not be the same species; in that case the natural enemies of the Jamaica species, even if introduced into Bermuda, might not prove so efficient a check on the Bermuda species as they are on the Jamaica form. This phase of the subject is one that is worthy of further consideration.

JAMAICA HONEY.

The following is extracted from the *Journal of the Jamaica Agricultural Society* for October:—

We in Jamaica often flatter ourselves that our honey is the best in the world, but if we could all attend the honey sales in Mincing Lane, in London, we should have little pride left in us—for much of the Jamaica honey is so dirty, so mixed with bits of dead bees, pollen, and other foreign matter, that there is hardly worse than it sometimes. It is with honey as it is with coffee: we produce some, comparatively very little, which sells at the very highest price, but the bulk sells at something near the lowest price. At one sale we attended, a lot of Jamaica honey from a lady keeper in Vere sold at the fine price of 26s. 6d. per cwt., the highest price that day being 28s. for some French honey. At another sale, Black River honey sold at 28s. per cwt. The home honey does not go into this market, being disposed of by contract direct with merchants. At the Royal Agricultural Show there was such a display of honey as made our finest efforts at display here appear poor and mean. There was clover honey as bright and clear as possible, and white as snow. Heather honey is a dark honey, but it is so distinct in flavour from other honey, and is so liked, that the prices obtained for it are the highest.

SISAL HEMP IN THE CAICOS ISLANDS.

In reference to the notes which have appeared in the *Agricultural News* in regard to the cultivation of sisal hemp in the Caicos Islands, it may be of interest to publish the following letter, which appears in the *U. S. Monthly Consular Reports* for July, from U. S. Consul Moffat, of Turks Island, in which he directs attention to the Turks and Caicos Islands as profitable fields for this promising industry:—

Considerable attention appears to be directed towards these islands as a suitable and profitable field for the growing of sisal grass, which may be partially due to the recent large investments made in the sisal fibre industry in Australia, East Africa, and elsewhere, stimulated, no doubt, by the relatively high quotations maintained during the past two years for the article.

For several years a company, almost entirely American, has been operating and extending its plantation here, and at the present time has 1,100 acres under full cultivation on the Caicos Islands, which form a part of this dependency. The entire output from this plantation is shipped to the United States. A newly formed company, which recently purchased the property and improvements of a company which had gone into receiver's hands and stopped extracting fibre some two years ago, will, within a few weeks, commence the shipment of fibre. Their product, although the company is of English chartering and the entire stock held abroad, will be exported exclusively to the United States.

The United States market appears to present a more remunerative and satisfactory outlet for the fibre, for, while ocean freights are lower to English ports than to New York, prices in England are at somewhat recessionary quotations. Furthermore, the United States market quotations represent sight cash, while the foreign market quotations are subject to a ninety-day cash discount. These offsetting conditions permit an advantageous net result through exporting to the United States.

The Government still holds several thousand acres available and suitable for sisal grass cultivation, upon which, I am informed, long leases may be had at an average nominal annual rental of 5*d.* (10*c.*) per acre.

Recently a representative of English capital visited the colony, while many inquiries, through correspondence, have been received from both Europe and the United States, which facts are indicative of a keen appreciation of the possibilities of the field for further profitable investment. This may be accounted for when one considers that the sisal leaves, when ready for cutting, can be cut, cleaned, etc., and landed at New York at a known cost of less than 3*c.* per lb. The margin of profit, therefore, at prevailing quotations is most satisfactory, and should permit generous returns on the investments made.

The quality of the article produced in these islands is conceded to be equal, if not superior, to the best grades of Yucatan fibre, and has, in consequence, commanded immediate market without question as to quantity.

From evidences at hand, consequent on the large acreage under cultivation ready for immediate cutting, and the completeness of the installed equipment, it is reasonable to assume that the coming year will witness a large increase over the amount heretofore exported.

An account of the progress of the sisal hemp industry of the Caicos Islands, which was started in 1890, appeared in the *West Indian Bulletin*, Vol. V, pp. 150-2.

SELECTION OF COCOA-NUTS.

Referring to the purchase from Ceylon of some 10,000 cocoa-nuts for distribution among planters, the Curator of the Botanic Station in Seychelles makes the following interesting observations, in his Annual Report for 1904, on the selection of nuts:—

The cocoa-nuts have all been purchased, although endless discussions have been raised with reference to their hardness and to the thickness of their 'meat' as compared with the Seychelles nuts. If one follows the growth of the Ceylon nuts in the nursery, one has little doubt with regard to both Seychelles and Ceylon nuts having the same variation in the coloration and general appearance of the young shoot. Both nuts belong to the same variety of plants and the only difference is that one is selected with a view of (1) increasing the size of the nuts, and (2) reducing the percentage of the envelopes; and the other is left to itself without selection. Regarding the thickness of the meat, I have a doubt as to whether this is not due to optical illusion. I have opened a great many nuts (about four dozen) in the presence of planters and in all cases except two the compared nuts were found to have the same thickness of meat. The diameter of the Ceylon nut being about three times greater than the diameter of the Seychelles nuts, the difference in the size of the hollow gives the appearance of a difference in the thickness of the meat. By careful measurement, the real thickness of the meat is easily ascertained, and this shows a certain variation in both kinds of nuts. Exceptionally big nuts (especially when not quite ripe) possess a comparatively thin meat, but these nuts are found both in Ceylon and Seychelles. The copra produced by 1,000 Ceylon ordinary nuts is about twice as much as that obtained from Seychelles nuts. This result has been obtained in the same soil, under the influence of the same climate, and is entirely due to selection.

It is to be hoped that the discussion raised on the subject by the planters, after their having seen the nuts introduced from Ceylon, may prove the beginning of a careful selection of nuts for planting in Seychelles. Many of them have already informed me that they have found on their estates a few of their trees producing nuts similar to those of Ceylon and that they intend keeping them for propagation. It is probable that the trees which produce very small nuts have less requirements than those which produce bigger nuts, and that varieties which produce big nuts normally will bear smaller nuts if they are starved out. But when one thinks of the very trifling amount of plant food which is removed from the soil by cocoa-nut cultivation, there seems to be no difficulty in supplying the elements which are required to a greater extent by the big-nut varieties. The planter must choose between having small nuts without trouble and having double the crop by using proper methods of cultivation and selection.

ARBOR DAY AT TOBAGO.

The Curator of the Botanic Station at Tobago reports that Arbor Day was successfully celebrated in that island on the King's Birthday, November 9.

The plants distributed free from the Botanic Station to managers of schools and others comprised fruit, shade, and economic plants, and numbered 216. Some hundred plants were also purchased for this purpose. General interest was taken in the Arbor Day movement throughout Tobago, and tree planting was adopted as the principal means of commemorating the King's birthday in the island.



GLEANINGS.

A collection of tropical fruits was sent from Penang to the exhibition held in London this year and obtained a silver medal. (*Annual Report on the Straits Settlements for 1901.*)

Limes of good size and packed in fancy paper, in boxes of 150 and 200, would meet a fair demand in London. (*Journal of the Jamaica Agricultural Society.*)

Captain M. Short, of Richmond estate, Tobago, writes that scrap rubber from five- and six-year-old trees on his estate was recently sold in London at 3s. 6d. per lb.

A correspondent writes in the *Journal of the Jamaica Agricultural Society*: 'I have been told by an old Montego Bay lady that she has used for eighteen years cushions stuffed with plantain fibre (from the stem). She says that it outlasts any kind of grass or other stuffing, and is better.'

Consequent upon the resignation of Mr. H. S. Hammond, F.C.S., who has proceeded to the Ontario Agricultural College, Guelph, Canada, Mr. E. J. Wortley has been appointed Assistant Chemist at the Government Laboratory, Jamaica, while Mr. G. D. Goode will succeed Mr. Wortley as Second Assistant.

With the view of encouraging the arts and crafts of the colony, the Board of Governors of the Jamaica Institute has decided to continue the annual exhibitions of objects of art industry. The next exhibition will be held in February 1906. Medals, certificates of merit, and money prizes will be awarded.

A tree of *Cassia bacillaris* has recently been observed in flower in Barbados. This plant is not recorded from Barbados by Grisebach or Schomburgk. The former authority mentions its occurrence in St. Vincent and Trinidad. It is a handsome tree with showy yellow flowers, of the same colour as those of *Cassia Fistula*.

The Officer-in-charge of the Agricultural School at Dominica reports that he has a limited number of cuttings of the following varieties of cassava available for distribution in the island: Jack-roë; Blue Top; Small Leaf; French no. 3; White Greenaway; Red Greenaway; Bitter no. 1; Bitter no. 4; Sweet no. 2.

Marked increases in the exports from Madagascar during 1904, as compared with the previous year, are apparent from the tables in the recently issued *Consular Report*. The increase is chiefly in gold, rubber, hides, raffia fibre, and bees'-wax. The value of the exports of rubber has increased 50 per cent., while that of hides was practically doubled.

Cotton had not hitherto been grown in the protectorate but a trial is now being made. A hybrid between a variety obtained from the head waters of the Amazons and the well-known Sea Island cotton of the southern states of America has been selected for the experiment. (*Annual Report on British Solomon Islands.*)

The *Textile Mercury* publishes a note showing that the partial failure of the Egyptian cotton crop of 1904 was due, to a great extent, to the use of poor seed. One cultivator purchased 10 bushels of selected seed and then filled up gaps in the rows with cheap seed bought at the nearest factory. It is not surprising that the crop was of a mixed quality.

An adjourned meeting of the Barbados Agricultural Society was held on Friday, November 17, for the purpose of further considering the report on the sugar-cane experiments carried on under the direction of the Imperial Department of Agriculture during the season 1903-5. A summary of the proceedings will appear later in the *Agricultural News*.

A correspondent has recently asked for information in regard to the prospects of the cultivation of ramie or China grass (*Boehmeria nivea*) in the West Indies. It may be mentioned that no one is growing this fibre plant in these islands because its cultivation is not remunerative on a commercial scale. The chief drawback is the absence of a suitable machine for extracting the fibre.

The following articles of export from Jamaica during the quarter ended June 30, 1905, show increases, as compared with the corresponding period of 1904: cotton, 150 bales, as against 21; bananas, 4,425,954 bunches, as against 509,291; and 1,103,382 cocoa-nuts, as against 741,680. Similarly, oranges increased from 584,750 to 2,351,080; honey, 61,550 to 82,764 gallons; sugar, 71,577 cwt. to 101,174 cwt.; cigars, 8,765 lb. to 11,837 lb.

The Hon. William Fawcett, Director of Public Gardens and Plantations, Jamaica, writes with reference to the note in the *Agricultural News* (Vol. IV, p. 317) on the 'Queen of Flowers': 'I may mention that *Lagerstroemia indica* is usually known here as "June Bush" from the fact that it begins to flower in June. Another name for it is "Crape Flower" from the texture of the petals and the way in which they are crumpled.'

The Agricultural Superintendent at Grenada writes: 'A flamboyante tree, growing on a steep slope below the Richmond Hill prison, was in full flower on my arrival in the island on June 6. Since that date it has flowered continuously, and though other trees in the neighbourhood have finished blossoming for a month or more, it is still a mass of scarlet flowers, rendering it a conspicuous object from the harbour.'

It is doubtful whether the natives in the southern portion of the protectorate will ever take up cotton growing of their own accord, as a better return is obtained from the cultivation of yams, etc., with far less work and trouble than the cultivation of cotton entails. It remains to be seen whether the efforts of the British Cotton-growing Association at Uromi and at Onitsha will prove sufficiently remunerative to permit of the experiment being continued. The chief obstacle is the cost of labour. (*Annual Report on Southern Nigeria.*)

AGRICULTURAL SHOW.

Virgin Islands.

The following is a copy of a letter from the Commissioner of the Virgin Islands to the Imperial Commissioner of Agriculture for the West Indies, dated October 19, 1905, in reference to the Agricultural Show held at Tortola on September 13 last:—

I am glad to be able to forward to you a report of the Agricultural Show which was quite a success; much more interest seems to have been taken in it than in previous years.

The stock was not quite up to the mark, but the sheep showed a decided improvement, due to the distribution of the young rams from the Experiment Station.

A very considerable number of goats (2,500) are shipped annually to the Danish West Indies, and a considerable demand has recently arisen for goat skins. I think it would be advisable to do something to improve the breed.

I hope it will be possible to do something a little later for the cattle, as many of them are so small and inbred that they are not able to compete with those exported from Porto Rico.

I am glad to report that there seems to be much more interest shown by the people in cotton. I expect the coming crop will show a substantial increase. There were several applications for loans at too late a date. I understand, however, that these applicants are preparing land for next year. The great difficulty is to make people understand that it is important to grow their cotton only from Sea Island seed and not from the seed of the cotton which has been growing wild since 1860-70.

Many of the people lead very isolated lives. We have no newspapers to give them information. I think if the report of the show and proposed Cotton Circular were printed, the circulation of them would greatly increase the people's interest in agricultural matters.

COMMITTEE'S REPORT.

An Agricultural Show, under the auspices of the Imperial Department of Agriculture for the West Indies, was held at the Experiment Station, Tortola, Virgin Islands, on September 13, 1905. Special efforts had been made to interest the inhabitants of the islands. Six meetings to explain the objects of the show were held in the town and country districts of Tortola, and the other islands of the group were visited. His Honour the Commissioner of the Virgin Islands kindly presided at the meeting in Road Town, and the Agricultural Instructor attended the meetings and gave valuable advice and information. The rules were explained, the prize list read, and questions invited, to give the people a thorough understanding of the exhibition. These meetings were all well attended and much appreciated. We found the people anxious for information, and we think the meetings did a great deal in securing their confidence, and encouraged them to give the show unprecedented support.

There were 750 exhibits out of 800 entries. The stock were arranged in the station yard. Rum, vinegar, sugar, starches, meals, preserves, minor products, lace and fancy work, etc., were shown on the upper story of the cotton factory, and the fruits and vegetables were displayed on the ground floor and in the sugar factory. Industrial products and poultry also occupied some space in the latter building. The exhibits, though displayed to the best advantage, were somewhat crowded through lack of space.

The number of entries in the class for stock was satisfactory, but the quality of the animals was not what it might have been. The sheep were an exception, showing a decided improvement on previous shows. There were very few exhibits in sugar, but a very large number in starches and meals, which is important as indicating a possible industry. Gentlemen from outside the Virgin Islands expressed pleasure at both the quantity and quality of the fruit shown. It is a matter for regret that there were so few entries in cotton (for which special prizes were offered), and that the exhibits were, with one or two exceptions, of somewhat inferior quality. The judges did not deem any exhibit of cotton from Anegada worthy of first prize. A Diploma of Merit was awarded to Mr. J. B. Romney, of Belmont, Tortola, for a fine sample of cacao; the other exhibits in this class were not very satisfactory; sufficient care had not been taken in the curing. The Industrial Section contained some very good exhibits. The lace work was excellent. The Tyre hats were very creditable, being light, comfortable, and of good appearance. It should be possible to dispose of these outside the islands if made in sufficient quantities. The exhibits in all the classes, taken as a whole, were satisfactory in quality and an advance upon previous years, and the quantity far surpassed all expectations.

The attendance was exceedingly pleasing, all the rooms and the station yard being crowded all the day with people, who appreciated highly this effort on their behalf. We were also honoured with the presence of many ladies and gentlemen from the neighbouring Danish islands.

At the close of the exhibition the prizes were distributed by his Honour the Commissioner, to whom the Committee asked to be allowed to present their best thanks for the interest he has taken in the show. The Committee also wish to thank heartily the Agricultural Instructor, Mr. W. C. Fishlock, for the interest he is taking in furtherance of the agriculture of the Virgin Islands and for undertaking the exceptionally heavy labours in preparing for and conducting this exhibition, which the Committee feel they have every reason to consider a great success. We also beg to tender our warmest thanks to the Rev. C. R. Trace for the valuable assistance he rendered, and to the ladies and gentlemen who acted as judges. Most of all, our thanks are due to the Hon. Sir Daniel Morris, Imperial Commissioner of Agriculture for the West Indies, whose grant for prizes made the exhibition possible.

EDUCATIONAL.

Teaching Agricultural Science in Jamaica.

The following note is extracted from the Annual Report of the Schools Commission in Jamaica:—

Apart from the special attention given to this matter at the Jamaica College, we have continued our efforts to promote instruction at other endowed schools in the sciences preparatory to a course in scientific agriculture. In some instances it has been practicable to establish suitable laboratory fittings, and further efforts in this direction will be encouraged. We have directed the attention of all secondary schools in the island to the scholarships offered at the Government Laboratory, and to the opportunities afforded there for attending lectures in agricultural science and for receiving practical instruction at the Experiment Station.

FORWARDING DISEASED PLANTS AND INSECT PESTS.

Much disappointment has lately been experienced, both by the sender and also by the receiver, through plants, supposed to be diseased, and insect pests reaching the laboratories of the Imperial Department of Agriculture in an unfit condition for scientific examination. It is hoped that officers of the Department and others will carefully study and follow the suggestions that have been given by the Department on former occasions. (See *Agricultural News*, Vol. I, p. 243, and Vol. II, p. 235.) The chief reasons for this state of things are one or more of the following:—

(1) The fragmentary nature of the material sent for investigation. (2) Lack of care in transmitting, the specimens arriving shrivelled or dead or mouldy. (3) Absence of information as to the conditions under which the plants grew.

It must be pointed out that a few fragments of a diseased plant are of little use for investigation, and sufficient material should be sent so that the primary cause of the trouble may be located.

In order that time and labour may not be wasted in the examination of unsuitable material, care must be taken in collecting and packing specimens so that they may arrive at Barbados in good condition. Fresh specimens of moist vegetable matter should not be sent packed in boxes or in envelopes, but should be either suitably dried and sent in a well-ventilated package or, preferably, placed in spirit immediately after collection and forwarded in a bottle or corked tube. Care must be taken with the strength of the spirit used. A 30-per cent. spirit is quite sufficient to act as a preservative, and this can easily be obtained by taking distilled rum and adding two parts of water to one of the rum. If material is sent in undiluted spirit or high wines, it becomes so hard and brittle that examination is exceedingly difficult.

When leaves, buds, or twigs are attacked, the specimens should show as many stages of the disease as possible. Detached leaves alone are, as a rule, useless. If practicable, the root, after the soil has been shaken off, should be sent, as, in many instances, the primary cause of the trouble is located there.

When fruits or herbaceous stems are attacked, pieces, showing all stages of the disease, should be placed in spirit as before. When it is thought desirable to send very large specimens, such as portions of branches, roots, or whole cacao pods, these should be collected as late as possible before the mail steamer leaves and sent in a well-ventilated case.

Full particulars should also be forwarded giving details of the time of appearance of the disease, the damage done, the part attacked, the nature of the soil, drainage, and also whether an apparently similar kind of disease had been previously observed.

With regard to the forwarding of insects for examination, directions have already been given in the *Agricultural News* (Vol. IV, p. 168), but on account of the repeated disappointment resulting from material being badly packed the following detailed instructions have been prepared.

Insect material for transmission must be packed in such a way (1) that it will not be broken, bruised, or crushed, and (2) that it will not be spoiled by the growth of moulds, mildew, or bacteria.

In considering the manner of forwarding insects, these may be divided roughly into these three groups: (1) Larvae that is, grubs, maggots, caterpillars, including

borers, etc. (2) Hard insects, such as beetles, bugs, grasshoppers, crickets, bees and wasps. (Scale insects may be included in this group.) (3) Frail insects, such as butterflies, moths, flies, etc.

In packing for transportation the following rules apply to these groups:—

Group I.—When sent alive, larvae should be packed with a supply of the food plants on which they have been found feeding or in the plant material they infest, in such way that they should not be rattled about in the package or crushed by portions of the food plant, etc. When not sent alive they should be preserved in a tightly-corked tube or vial, in diluted spirit or formalin.

Group II.—When sent alive these insects should be provided with food, as for instance, in the case of lady-birds, leaves and twigs infested with the plant lice or scale insects on which they feed should be included and packed in such a way that they cannot rattle about in the box. Footholds, such as crumpled pieces of blotting paper, should be given the insects also. When not sent alive insects of this group should be dried and wrapped loosely in soft tissue-paper, each insect in a separate paper, and then packed in a strong box. In the case of scale insects, each infested leaf and twig should be folded or wrapped in soft paper and dried before being enclosed in a tight package.

Group III.—Insects of this group should be killed and handled carefully to prevent injury, folded or wrapped in paper and well dried before being packed. Butterflies, with their wings folded together, may be folded in paper, moths may be wrapped loosely in tissue paper, and flies may be included in layers of tissue paper between cotton wool, in small boxes.

Full notes should accompany all insect specimens, stating the nature of the damage done, the part of the plant attacked, where insects were found and whether larva or adult does the damage; if the larva, a specimen of the adult should be included also, if possible. Notes on their habits such as whether night feeder or day feeder, where eggs are laid, etc., etc., should in every case be added, so far as known.

Disappointment is most likely to result from (1) insufficient material, (2) insufficient notes and information as to habits, etc., (3) bad packing which allows specimens to be crushed or to decay in transportation, and (4) from sending specimens so broken and battered that it is impossible to identify them.

MILLIONS.

It will be remembered that early in the year notes appeared in the *Agricultural News* (Vol. IV, pp. 127 and 138) in reference to the suggestion that the immunity of Barbados from malaria might be due to 'the presence in the swamps and ponds of the island of large numbers of tiny fish, known as "millions."' In the last issue of the *West India Committee Circular* it is stated that some of these fish were presented to the Zoological Gardens, London. The Superintendent of the Gardens reports that 'the fish are thriving wonderfully, and are feeding voraciously upon the larvae of gnats.' Some of the fish were sent to the Natural History Museum for identification and they are pronounced to be closely allied to, if not identical with, a species named *Girardinus versicolor*. It may also be mentioned that quantities of these fish were forwarded by the Imperial Commissioner of Agriculture to Antigua and St. Kitt's, where they are reported to be doing well. At both these places they are being kept at the Botanic Station and, as they increase in numbers, they will, from time to time, be distributed to the ponds and swamps in these islands.

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following review, dated October 18, 1905, of the position of West Indian products on the Canadian market:—

Considerable trade is being done at all points, deliveries being pushed forward prior to the early setting in of winter. The wheat harvest and the fruit crops have fully reached the estimates, while dairy products are commanding high prices. These factors are now having their effect on the general prosperity.

SUGAR.

A general quiet market exists with very little variation, and offerings from the West Indies are meagre, and without much inducement. The June Report of Trade and Commerce, recently issued by the Canadian Government, gives some interesting figures on the direction of trade:—

	Imports, month of June.		Twelve months ending June 30.	
	1904.	1905.	1904.	1905.
Great Britain...	\$ 48,130	\$ 59,194	\$ 240,301	\$ 458,617
United States...	9,452	1,735	78,038	164,158
Belgium ...	29,525	.....	258,150	130,078
B. Guiana ...	83,695	320,003	2,167,595	2,529,611
B. W. Indies ...	599,504	339,988	3,168,150	3,955,637
Germany ...	9,047	3,346	593,154	14,413
Other Countries	120,864	519,352	1,056,780	1,368,662
	\$ 900,217	\$ 1,243,618	\$ 7,562,168	\$ 8,561,176

A considerable increase is apparent in the shipments from Great Britain, these sugars being mainly refined sugars made from sugars grown within the British Empire, and are admitted into Canada under the preferential tariff. As the West India and British Guiana sugars are available for making these grades, an additional outlet is being created, owing to the premium those sugars command for the Canadian market, and hence the better prices paid in Greenock, as against Canada and New York, during the last fortnight. All prices are nominal.

MOLASSES.

A very quiet trade is being done. Barbados are being quoted at 31c., but there are no buyers. Stocks are being distributed to outlying points, and a steady trade is being done by the wholesale trade.

COCOA-NUTS.

A considerable advance is now recorded in New York, but the market here continues in a dull and uninteresting condition; no advance can be recorded.

ORANGES.

Supplies of Jamaica are coming in freely, and the quality is fair, though greater sweetness is desirable. The demand continues slow, and prices are very low; in a few weeks, however, a better market will be experienced.

SPICES.

Pimento is slow in demand and prices remain the same. The new crop of ginger is being looked for. Nutmegs are in fair demand.

VANILLA CULTIVATION IN MEXICO.

The following note on vanilla cultivation in Mexico appeared in the *U. S. Monthly Consular Reports* for June last:—

This section of the state of Vera Cruz is the natural habitat of the vanilla vine, which thrives in perfection and forms a source of great profit to those engaged in its culture, which is exceedingly simple. The land is cleared of underbrush, and the vine cuttings, which should be about 18 inches long, are planted beside suitable trees, left standing for the purpose. As soon as the joints commence to sprout they throw out tendrils, which cling tenaciously to the trees, and soon form climbing vines, which after three to four years commence to bear. In the fifth year the vine will be in full bearing, and will produce from fifteen to forty beans, each bean worth from 8c. to 10c. Mexican (3·82c. to 4·77c. United States); in certain years the beans have been known to sell as high as 18c. (8·59c.) apiece. The cured beans command a much higher price. It is only the experienced curer who understands the process, which is a delicate one, but easily acquired by practice and observation.

It is estimated that a 5-acre vanilla plantation will yield sufficient income to render its owner independent for the remainder of his life. But in order to succeed it is necessary to give the tender vines personal and constant attention as they pass from stage to stage in their growth, and to protect them from rough treatment, to which they are usually exposed when left in charge of hired help. Where one planter has succeeded hundreds have failed, owing to lack of personal care. This is strikingly illustrated by visiting the great vanilla districts, where it will be noticed with what tender solicitude young vines are nursed by the French and Italian colonists, who have made such a remarkable success of their plantations and who have grown wealthy following this pursuit.

Vanilla cultivation is especially adapted to women or persons who cannot endure exposure or hardships. The vine is interesting, and its culture is a seductive and profitable occupation. Along the Tuxpam River and for 50 to 60 miles inland south-west of this place there is an extensive territory well suited to the cultivation of the vanilla and kindred tropical products.

FRUIT TRADE OF BRITISH HONDURAS.

The *Annual Report* on British Honduras for 1904 has the following reference to the colony's fruit trade:—

There is no country in Central America more favourably situated for building up a fruit trade with the United States than British Honduras, but the fruit-growing lands, owing to the want of communication, are as yet but very partially developed. Most of the bananas grown in the colony are produced in the Stann Creek district, and, during the last two or three years, there has been a tendency to increase the area of cultivation in that district.

At present bananas are planted on the low-lying lands along the banks of the rivers, which are subject to the invasion of floods when the rivers rise above the normal level. During 1904 such plantations suffered considerably in consequence of floods. As the rivers are the only means of transport at present, planters are unable to establish themselves on the higher lands further inland. When these lands are tapped by railways, there will be more security for investing capital in the growing of fruit.

The demand for cocoa-nuts during 1904 was exceptionally good and high prices were paid.

MARKET REPORTS.

London,—October 28, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 27, 1905; and 'THE PUBLIC LEDGER,' October 21, 1905.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 21/- to 60/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/3 to 1/4 per lb.
BEES'-WAX—£7 10s. to £8 per cwt.
CACAO—Trinidad, 51/- to 54/- per cwt.; Grenada, 47/- to 51/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.
COTTON—West Indian, medium fine, 6.05d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 5/6 per bunch.
GRAPE FRUIT—10/- to 11/- per box.
LIMES—3/6 to 4/6 per box.
ORANGES—Jamaica, 8/6 to 10/6 per box of 176-200.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, low middling to middling, 43/- to 48/- per cwt.
HONEY—17/- to 19/- per cwt.
ISINGLASS—West Indian lump, 2/3 to 2/7; cake, 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/6 per lb.
Distilled Oil, 1/4 to 1/5 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair to good pale, 1/3 to 1/5; dark to fair red, 1/1 to 1/2; broken, 1/- per lb.
NITRATE OF SODA—Agricultural, £10 17s. 6d. per ton.
NUTMEGS—54's, 1/10; 67's, 1/3; 80's, 1/-; 96's, 7½d.; 110's, 6½d. to 7d. per lb.
PIMENTO—Fair, 2½d. to 2¾d. per lb.
RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.
SUGAR—Yellow crystals, 15/6 to 17/6 per cwt.; Muscovado, 14/6 to 15/6 per cwt.; Molasses, 11/- to 16/6 per cwt.
SULPHATE OF AMMONIA—£12 17s. 6d. per ton.

Montreal,—October 18, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$24.00 to \$25.00 per M.
COFFEE—Jamaica, medium, 10c. to 11c per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
ORANGES—Jamaica \$5.50 per barrel, duty paid.
PIMENTO—Jamaica, 5¼c. per lb.
SUGAR—Grey crystals, 96°, \$2.08 to \$2.25 per 100 lb.
—Muscovados, 89°, \$1.60 to \$1.75 per 100 lb.
—Molasses, 89°, \$1.35 to \$1.50 per 100 lb.
—Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—October 27, 1905.—Messrs. GILLESPIE BROS. & Co.

BEES'-WAX—31c. per lb.
CACAO—Caracas, 11½c. to 12c.; Grenada, 10¾c. to 11c.; Trinidad, 11¼c. to 11¾c.; Jamaica, 9½c. to 9¾c. per lb.
COCOA-NUTS—Jamaica, and Trinidad, \$28.00 to \$30.00 per M.
COFFEE—Jamaica ordinary, 8½c. to 10½c.
GINGER—Jamaica, 7c. to 9c. per lb.

GOAT SKINS—Jamaica, 56c.; West Indian, 49c. to 50c. per lb.
GRAPE FRUIT—Jamaica, \$5.00 to \$6.50 per barrel; \$2.50 to \$4.00 per box.
HONEY—Jamaica, 65c. to 67c. per gallon (duty paid).
LIMES—No quotations.
MACE—17c. to 31c. per lb.
NUTMEGS—West Indian, 80's, 20c. to 21c.; 110's, 13½c.; 120's 9c. to 10c. per lb.
ORANGES—Jamaica, \$4.00 to \$4.25 per barrel.
PIMENTO—4¾c. to 4¾c. per lb.
PINE-APPLES—No quotations.
SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 2½c.; Molasses, 89°, 2¼c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—November 11, 1905.—Messrs. T. S. GARRA-WAY & Co., and Messrs. JAMES A. LYNCH & Co.

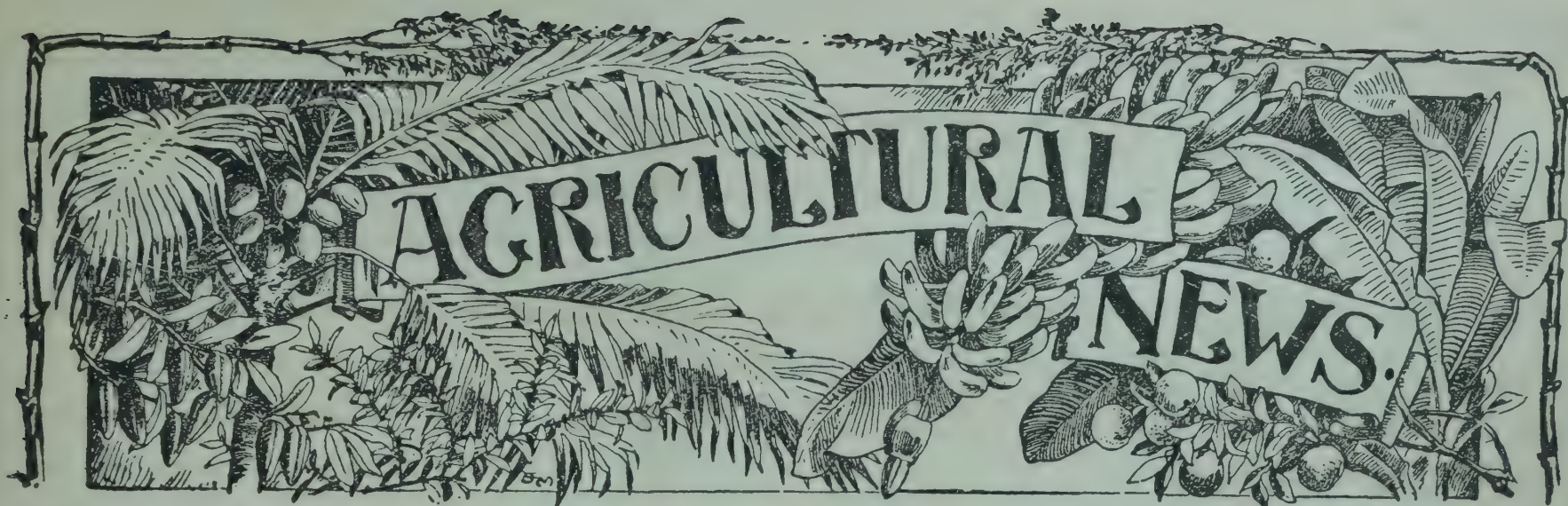
ARROWROOT—St. Vincent, \$4.50 per 100 lb.
CACAO—\$10.00 per 100 lb.
COCOA-NUTS—\$14.00 per M. for husked nuts.
COFFEE—\$10.50 to \$11.00 per 100 lb.
HAY—95c. per 100 lb.
MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
ONIONS—Madeira, \$3.50 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, \$3.00 to \$3.60 per 160 lb.
RICE—Ballam, \$4.90 per bag (190 lb.); Patna, \$3.10 to \$3.20; Seeta, \$3.10 to \$3.20; Rangoon, \$2.50 to \$2.55 per 100 lb.

British Guiana,—November 8, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 14c. per lb.
CASSAVA STARCH—\$5.50 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—Rio, Jamaica, and Curaçoa, 13¼c. to 13¾c.; Creole, 14c. per lb.
DHAL—\$3.90 to \$4.00 per bag of 168 lb.
EDDOES—88c. per barrel.
ONIONS—Madeira, 3½c. to 4c. per lb.
PLANTAINS—8c. to 28c. per bunch.
POTATOS, ENGLISH—1c. per lb. retail.
POTATOS, SWEET—Barbados, 60c. per bag.
RICE—Ballam, \$4.30 per 177 lb.; Creole, \$4.00 to \$4.10 per bag. (ex store).
SPLIT PEAS—\$6.00 per bag (210 lb.).
TANNIAS—\$1.20 per barrel.
YAMS—White, \$1.92; Buck, \$2.16 per bag.
SUGAR—Dark crystals, \$1.77½ to \$2.05; Yellow, \$2.70 to \$2.75; White, \$4.00 to \$4.10; Molasses, \$2.00 to \$2.10 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—November 10, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.40; estates, \$11.70 to \$11.75 per fanega (110 lb.); Venezuelan, \$11.40 to \$12.00 per fanega.
COCOA-NUTS—\$21.00 per M., f o.b.
COCOA-NUT OIL—67c. per Imperial gallon (casks included).
COPRA—\$2.90 to \$3.00 per 100 lb.
DHAL—\$3.20 to \$3.25 per bag.
ONIONS—Stringed, \$2.00 to \$2.25 per 100 lb. (retail).
POTATOS, ENGLISH—60c. to \$1.02 per 100 lb.
RICE—Yellow, \$4.25 to \$4.50; White, \$4.50 to \$5.60 per bag.
SPLIT PEAS—\$5.00 to \$5.20 per bag.
SUGAR—White crystals, \$4.50; Yellow crystals, \$2.75 to \$3.00 per 100 lb.



A FORTNIGHTLY REVIEW
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Bud-Rot Disease of the Cocoa-Nut Palm.

MENTION has already been made in the *Agricultural News* (Vol. IV, p. 299) of the occurrence in the western tropics of a serious disease of the cocoa-nut palm, known as

'bud-rot.' As was briefly stated in the last issue of the *Agricultural News*, all the available information relating to this disease, which is causing considerable anxiety all over the West Indies, has been collected and reprinted in the *West Indian Bulletin* (Vol. VI, no. 3) in the hope of assisting in the efforts that are being made to confine it within the localities where it now exists.

An important point which appears to have been established is that what is now known as the 'bud-rot' disease has probably existed in this part of the world for more than thirty years. It is not unlikely that one of the diseases of the cocoa-nut palm, investigated in British Guiana in 1875-6 by the late Hon. William Russell, may have been identical with that since known as bud-rot. In 1893 mention was made in the *Kew Bulletin* of a disease described as 'fever' which was reported to be occurring in British Honduras. It is suggested that this disease also may be allied to, if not identical with, that described by Mr. Russell.

It is probable that between 1876 and 1891 the effects of the disease were not of a serious character. But after the American occupation of Cuba cocoa-nut palms in that island were found to be dying in large numbers of a mysterious disease, and more general interest was taken in it. In consequence, an officer of the U. S. Department of Agriculture was deputed to make detailed investigations in 1901. Since that time the disease has been investigated in Jamaica and elsewhere.

Latterly, the bud-rot has forced itself into prominence in Trinidad, where, on one plantation, it is

reported that 2,000 trees out of a plantation of 25,000 have been lost within the last six months. The disease has also been causing anxiety in British Guiana.

As regards the origin of the bud-rot disease, it may be mentioned that it has been stated that a fungus was the primary cause of the trouble; but further investigations would appear to indicate that bacteria play an important part in the causation of the disease. The organism is reported to develop 'in the sweet coatings of the young protected organs and finally it reaches the "cabbage" or central growing point, which it soon reduces to an offensive-smelling mass.'

It is probable that no remedial measures will be effective in the case of palms seriously attacked. To prevent the further spread of the disease all diseased palms should be cut down and infected portions destroyed by fire or buried with lime. Experiments carried out in Jamaica have shown that spraying the palms with Bordeaux mixture on the first indication of the disease is more or less effectual. As, however, the disease is of a virulent character, the most energetic efforts will be needed to stamp it out.

It is of interest to note that there are indications that in Jamaica there is a certain green-skinned variety of cocoa-nut less liable to bud-rot than the reddish and yellowish kinds. If further experience should confirm this statement, it may be possible to establish by careful selection a race of cocoa-nuts resistant to this disease.

It is hoped that, with the very full information now available in reference to the bud-rot disease and the observations and recommendations made in regard to it in such widely situated localities as Cuba, Jamaica, British Honduras, British Guiana, and Trinidad, the members of the planting community will have at their disposal ample material upon which to base the identity of the disease, and the agricultural officers engaged in dealing with it will be in a position to recommend such practical remedies as are likely to be effective and suited to local conditions.

It may be mentioned that there is in Jamaica another disease of cocoa-nuts, which has been described in the *West Indian Bulletin* (Vol. IV, p. 5) as the 'cocoa-nut wasting disease.' In British Guiana considerable damage has been done to the cocoa-nut and other palms by a caterpillar which strips the

leaves. The bud-rot does not seem to have made its appearance in Barbados; but the cocoa-nut palms in that island have suffered for many years, and still suffer, from the attacks of scale insects, which are being carefully investigated by the Entomologist on the staff of the Imperial Department of Agriculture.

Altogether, the outlook for the cocoa-nut industry in the West Indies at the present time is not as favourable as could be desired, but, provided that energetic and concerted action is taken by those concerned, and the advice of the various agricultural officers that are dealing with the subject is closely followed, serious apprehension need not be felt as to the ultimate results.

YAUTIAS OR TANNIAS.

Mr. O. W. Barrett, formerly Botanist and Entomologist at the Porto Rico Agricultural Experiment Station, has made a careful investigation of this important food plant of the West Indies, and his results have recently been published in Bulletin No. 6.

Mr. Barrett refers to the confusion that exists between the taro, so common throughout the warmer regions of the Old World, and the tannier of Tropical America. He says: 'Without entering upon a technical discussion of the specific differences, we will dismiss the taro (*Caladium colocasia* *) with the brief statement that the leaf of all its varieties is peltate, that is, the petiole is attached to the under surface of the blade at a point more or less remote from the margin; whereas the yautia leaf is never peltate, but has the leaf-stalk attached to the very margin of the blade.'

The three cultivated species of yautias (known in the British West Indies as tannias, tanniers, cocoos, or eddoes) are described as *Xanthosoma sagittaeifolium*, *X. atrovirens*, and *X. violaceum*. Some forty varieties are known in Porto Rico.

'The yautia is one of the world's oldest cultivated crops. It seldom flowers and never produces seed. It is a native of Tropical America and is scarcely known outside of this district.'

In chemical composition tannias do not differ materially from Irish potatoes and sweet potatoes. They contain about 26 per cent. of carbohydrates (mainly starch) and 1.7 to 2.5 per cent. of protein.

When 6,000 to 12,000 plants are set to the acre, the yield is from 7 to 15 tons of tubers per acre in ordinary soils. Tannias take from eight to twelve months to mature.

In addition to their value as a vegetable, tannias may be utilized as a source of starch and flour. For the former it is considered likely to rival the cassava. Experiments indicated that 20 to 25 per cent. of starch is readily obtained from fresh 'roots.' From the white varieties a starch fully as white and lustrous as that from the common varieties of cassava was obtained. Flour was made by grinding dried slices of the peeled tubers; 10 lb. of tubers yielded, after three hours' drying in the oven, about 3 lb. of flour. The cost of raw material to produce 1 lb. of flour is about 2c.

* Synonym, *Colocasia antiquorum*, var. *esculentum*, Schott.



WEST INDIAN FRUIT.

WEST INDIAN FRUIT TRADE.

The British West Indian Fruit Co., Ltd., have written to the Imperial Commissioner of Agriculture, under date of November 10, as follows :—

We beg to inform you that we have acquired the fruit-importing business of Messrs. W. Pink and Sons, which we shall conduct in much the same manner as they have done. We shall be very glad to have your continued help in the establishment of the West Indian fruit trade in this country, and it will give us very much pleasure to endeavour to help the interests of this trade in every possible way.

ORANGES IN TRINIDAD.

The following is extracted from the *Annual Report* on the Trinidad Botanical Department for 1904-5:—

The supply of budded oranges has been maintained, and the extra sections started last year enabled the Department to meet successfully the demands made upon it. The increase of interest in the fruit trade has given great impetus to the growing of selected named varieties, and our first sales of this class of supplies have done so well, generally, that the demand for plants is steadily on the increase. Trinidad oranges shown at the Colonial and Indian Exhibition were much appreciated, and were fully equal to any exhibited by other colonies. That they can be successfully carried to the English market, if due care is taken in the packing and shipping, has been fully proved. In the writer's knowledge small annual consignments have invariably arrived in England in excellent condition during the past five years. The budding grounds have been filled, emptied, and filled again during the past season. The system of budding adopted is very successful, and the nursery lads are fast becoming expert operators. The success of the system has resulted in reduction of the sales of seedling oranges to the lowest minimum known. It is an encouraging feature that our people are beginning to recognize the value of named varieties of this fruit, as the planting of such kinds must result in the production of fruit infinitely better suited for export. It has been proved to the hilt that, given good package and stowage, Trinidad oranges can reach the English market in excellent order, and there appears no reason to doubt the success of those who are interesting themselves in the production of this class of fruit. Fruit from seedlings should always be tested before export, as one single case of inferior fruit will do much to lower rates paid, while good and well-known brands, which can be depended upon, will always command a ready sale.

BANANA VINEGAR.

The *Journal of the Jamaica Agricultural Society* gives the following recipe :—

Peel the ripe bananas and place them in a jar or large vessel. Pour off the juice each day as it accumulates, until there is only the coarse, spongy debris left. Strain the juice through a thick piece of brown calico (the calico must be washed first), and let it stand until turned to vinegar. The vessel that holds the juice should not be corked, but have a piece of thin muslin tied over its mouth, to let the air in and to keep out insects, etc. The time for the juice to become good vinegar depends on the condition of the bananas used. Indifferent fruit makes poor vinegar. A common way to make banana or mango vinegar is to fill a corn bag with the ripe fruit and hang it over a wooden tub to collect the juice, but the flavour of the vinegar is not so good as if a jar or enamelled vessel were used.

CACAO CULTIVATION IN GRENADA.

The *Grenada Chronicle and Gazette*, of October 28, contains the report of an interview with the Imperial Commissioner of Agriculture. After discussing the prospects of establishing a banana industry, the Hon. Sir Daniel Morris referred to the cacao industry. The following is the substance of his remarks in this connexion:—

As an offset to the fall in the price of cacao, more attention should be devoted to the cultivation of the existing areas of cacao, and he was of opinion that the cost of production might be reduced without lessening the output. Considerable waste of material and labour might be saved. Every ounce of manure used under scientific control can be made to yield a remunerative return.

He believed that even the good results which are now obtained on some of the best estates, and which are far beyond the average for the island, could be considerably increased. The output of cacao had not kept pace with the increased area put under cultivation. It would seem that the return from some of the peasant holdings had been considerably affected by large trees, like mangoes, cocoa-nuts, etc., which had been permitted to grow among the cacao.

He was of opinion that the prize holdings scheme, so successfully adopted in Jamaica, if carefully organized and started in a district where a large number of peasants could be enlisted to compete, should prove the simplest and most effective means of raising the standard of cultivation on peasant holdings.

SUGAR-CANE EXPERIMENTS AT BARBADOS.

An adjourned special meeting of the Barbados Agricultural Society was held at 2.30 p.m. on November 17 last, at the Planters' Hall, for the purpose of discussing the results of the Sugar-cane Experiments carried on in Barbados for the season 1903-5, presented by Mr. J. R. Bovell, Agricultural Superintendent, at a meeting of the Society on November 3. After some further interesting remarks by Mr. Bovell and answers given to questions presented by the Hon. G. L. Pile and others, Mr. Cameron stated that the figures presented by him represented concrete facts based on results tabulated from day to day. The tonnage of sugar referred to was actually shipped, not estimated.

The Hon. Sir Daniel Morris, addressing the meeting, said:—

Mr. President and gentlemen,—Before we close this afternoon I would like to say a few words on the general situation as regards the sugar industry. It is evident from the admirable summary of the results of the sugar-cane experiments presented by Mr. Bovell and Mr. Radclyffe Hall and the facts elicited in the discussion that we are steadily advancing in the direction of raising new canes richer in sugar content and more capable of resisting disease. It is evident, also, that the methods that are being adopted to meet the requirements of the planters are well suited to attain the ends in view. The canes raised are not only appreciated here, they are also greatly valued in other sugar-growing countries. This is especially true of cane B. 208, which is being largely cultivated in British Guiana, Jamaica, Cuba, Porto Rico, Natal, and Queensland, where it is regarded as one of the richest canes under cultivation. As I mentioned at the previous meeting, it is proposed to carry on the experiments on the present lines for three years longer. Whether they are to be continued in full after that period will depend on the position then attained, and whether the members of the planting community in this and other parts of the West Indies can convince the Imperial Government that it is still necessary to provide the means for carrying them on. It is right, however, that I should bring before you to-day and ask your earnest consideration in regard to other directions in which the position of the sugar industry in this island may be improved. It is well known that it costs from 12s. to 13s. to produce a ton of canes in Barbados. This is possibly higher than in any other cane-growing country. It is probable that the circumstances at Barbados justify this. In any case, I am not prepared at this moment to go into details and point out how canes may be grown at a lower cost. It is not unlikely that, because labour is so cheap and abundant, agricultural operations are not so closely restricted as in localities where labour is dearer; also, that planters have not felt the necessity for adopting labour-saving implements and methods which are essential to the success of the industry in other parts of the world. One very prominent item at Barbados is the cost of artificial manure. I notice that Mr. Bovell in a paper read at the Agricultural Conference of 1899 places the average cost per acre for artificial manure at \$16.24 (£3 7s. 8d.). Is it established that the Barbados soil actually requires this expenditure in addition to an average expenditure per acre (also stated by Mr. Bovell) of \$17.42 (£3 12s. 7d.) for farmyard manure? These items deserve to be very carefully scrutinized in the light of the results brought before you by the Imperial Department of Agriculture. It is possible that, with a larger use of first-class farmyard manure, the amount of artificial manure, for plant canes at all events, might be reduced.

During the last two or three years we have heard little or nothing of proposals to establish a pioneer Central Factory in Barbados. As you are aware, this matter was very fully gone into some time ago. Your President in

a paper read at the Agricultural Conference of 1900, expressed his opinion as follows: 'Not only must we have central factories in order to avoid the enormous loss attending the present system of manufacture by means of small and imperfect crushing machinery and open taylories, but to be able to manufacture any class of sugar that may be in demand in the markets of the world.' Further, he stated: 'It is absolutely essential to our existence that central factories should be erected here.' Professor Harrison, with his long experience of Barbados and his more recent acquaintance with the working of central factories in British Guiana, at the same Conference stated: 'There is not the slightest doubt in my mind that, if this colony of Barbados is to continue to exist as a sugar-producing colony, it must adopt the principle of central factories.' And further: 'All I can say is, that I believe the erection of central factories in Barbados would be a means of raising the colony out of its present difficult position and in fact prove its salvation.' Nothing has happened since to alter the situation, and if we allow matters to drift on, as at present, there is little hope of permanent improvement in the principal industry on which the safety and welfare of the community depend. In this connexion, it may be of interest if some of the results of the working of the new central factory erected at Antigua, for the current year, were placed on record. This factory, including 5½ miles of railway, locomotives, etc., has cost £42,408 (see *West Indian Bulletin*, Vol. VI, pp. 60-4). Particulars to hand for 1905 are as follows:—Tons of cane crushed, 15,860; gallons of diluted juice, 2,437,500; 1st. sugar, 96° crystals, 1,603 tons; gallons molasses, 7,700; tons of canes per ton of sugar, 9.73; price paid for canes, 11s. 8½d. per ton; cost of making a ton of first crystals, 96°, delivered on wharf, £2 15s. 4½d. According to these figures, it has required 9.73 tons of canes to yield 1 ton of 96° crystals. At Barbados we are told it requires 13½ tons of canes to make 1 ton of muscovado sugar. It follows that a loss of 3¼ tons of canes is incurred on every ton of muscovado sugar produced in this island. This means that, with an annual average crop of 50,000 tons of sugar, the value of 187,500 tons of canes is lost through defective crushing. Further, if we take a ton of canes in Barbados as worth 12s., the loss, expressed in money, would amount to £112,500. I admit this is an outside estimate as between the muscovado sugar produced at Barbados and the 96° crystals produced at a central factory. If, however, we estimate that only one-fourth of the Barbados crop is dealt with by a central factory, there would still be a possible saving in money value of nearly £30,000. With the present low prices, this is an appreciable amount to add to the resources of those dependent on the sugar industry. It has been urged that the establishment of central factories in Barbados would lead to the displacement of a large amount of labour and reduce the number of managers, overseers, and others. I hold in my hand a statement which has been carefully prepared at Antigua, showing the number of persons displaced owing to the establishment of the central factory in that island, including children spreading fuel, etc. The result is that, while 152 labourers and children have been displaced on the estates, 113 have been employed at the factory, leaving thirty-nine actually displaced. It is pointed out that at the factory the people employed are more skilled and command higher wages. Four managers have been displaced, but against this we have to count the manager of the factory, overseers, and chemist. It would appear, therefore, that the establishment of a pioneer factory, capable of turning out 3,000 to 5,000 tons of sugar, would not displace an appreciable proportion of workers, while the factory would add several thousand pounds increased value to the sugar produced. We have also to bear in mind that if we continue to produce muscovado sugar we may, later on, find great difficulty in finding a good market for it. Neither the United States nor Canada cares for raw sugar. They prefer, for refining purposes, 96 per cent. crystals; and in regard to the muscovado shipped to the United Kingdom, we have to remember that what is refined there is shipped to Canada, where it obtains the full benefit of the preferential tariff, which is denied to the muscovado sugar

SUGAR-CANE EXPERIMENTS AT BARBADOS (Contd.).

shipped direct to Canada from the West Indies. In conclusion, I think it well to draw attention once more to the fact that we have not yet travelled over the whole ground covered by the experiments. We may raise canes to withstand disease, but if at the same time we lose a very large proportion of the canes we have grown, we cannot possibly place the sugar industry on such a footing as it ought to be. These experiments having been placed before you, I shall be glad if they lead to discussion to-day, or at some other time, in order to show whether we cannot start a pioneer central factory in this island. (Cheers.)

Mr. S. S. Robinson asked the Imperial Commissioner whether the planters of Antigua who were paid 11s. 8½d. per ton for their canes had any share besides in the profits of the factory.

The Hon. Sir Daniel Morris said they were paid according to a sliding scale, and if, at the end of the season, they had received less than 10s. per ton, the first claim on the net profits of the factory was to increase the price to 10s. Any profit still remaining unallotted was then divided equally between the planters and the shareholders of the factory. This is more fully stated in the *West Indian Bulletin*, Vol. VI, p. 61.

Mr. G. Eliot Sealy said: Before we separate there is one matter which I wish to bring before the meeting in connexion with these experiments. We have all heard with great interest the report that has been read of the work done by the Imperial Department of Agriculture for the season, and the discussion which has taken place on that report. And we all must realize, if we have not done so before, the obligation which we are under, first of all, to the Home Government for establishing the Imperial Department of Agriculture for the West Indies, and secondly, to Sir Daniel Morris and his hard-working staff of officers for the good and lasting work they have done amongst us. (Cheers.) Whether they are approached with a question connected with the sugar industry, the cotton industry, the banana industry, or any other industry, the officers of the Department are always ready with their advice, not only when it is asked for, but when it is thought a good thing to give their advice, such for instance as the address which the Hon. Sir Daniel Morris has read to us this afternoon. The report which has been read on sugar-cane experiments for the season shows very clearly the enormous scale on which this work is being carried on, but it is impossible to expect the officers of the Department to complete the work they have in hand in any given time. There are some like myself who rather dread the expiration of the period for which the Department has been appointed, and I therefore take the opportunity to place on record our appreciation of the work done by the Department, and beg to move the following resolution:—

Resolved.—That the Barbados Agricultural Society hereby desire to place on record their appreciation of the work carried on by the Imperial Department of Agriculture for the West Indies in connexion with the sugar-cane experiments in this island, and would express the sincere hope that the Imperial Government would see its way to continue the grant in connexion with them until the scientific investigations now in hand have placed the industry on a satisfactory footing. (Cheers.)

Mr. W. H. Smith, in seconding the resolution, said: I quite endorse all that has been said by Mr. Sealy, and personally I would say that great courtesy has always been extended to me by the officers of the Department of Agriculture. Mr. Bovell on one occasion kindly came to Drax Hall and visited several fields of canes there. He was shown a great deal and readily gave me his opinion in connexion with everything submitted to him. Professor d'Albuquerque has also, in the matter of analyses, shown me similar courtesy. I therefore beg to second this resolution most heartily. With regard to seedling canes, I think we are now getting a better class than formerly. Perhaps we planters have been a little too quick to form an opinion as to their merits or demerits and have not given them the time they deserved. In the case of B. 147 it seems to be

a very marked cane. There is very great demand for tops and the cultivation of it seems likely to be extended. (Cheers.)

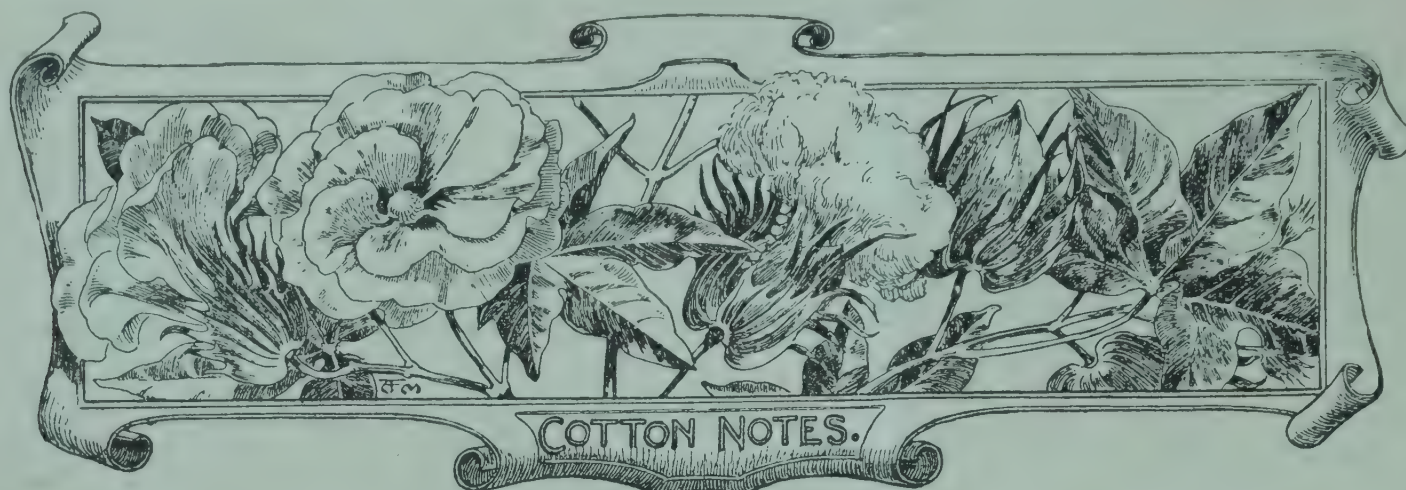
The President said: In supporting this resolution there is very little left for me to say with regard to the interesting account Mr. Bovell has given us of these sugar-cane experiments, but I should like to express the thanks of the society for having had the privilege of listening to Mr. Bovell's address and the opportunity of discussing the results which he has so clearly placed before us. I should also like on behalf of the society to say how indebted we are to Sir Daniel Morris and his staff for the hard work which they have carried through so successfully in this matter of cane experiments. I do not think there are many of us, in fact I may say there is not one of us, who will differ from the sentiments expressed by Mr. Sealy in moving his resolution. But having brought the work up to the point when it requires, say, a few years more to give some really valuable results, it would be a disaster not only to the sugar industry of Barbados but elsewhere, if the operations of the Department were soon discontinued, because it seems to me that in all parts of the sugar-growing world they are looking to Sir Daniel Morris' Department in the West Indies for results in the matter of seedling canes. (Cheers.) Of course we are not concerned with the rest of the world; they know how to take care of themselves. But as regards Barbados, it would certainly be a calamity to the sugar industry that what seems such a promise as has been held out to us should not be realized. There can be no doubt that, if time is given the seedlings such as these which we are working on, we shall get a cane that shall place our industry on a prosperous footing. But as Sir Daniel Morris has told us, there is no good having the best cane in the world if we make a class of sugar that is not wanted, for, in that case, we may as well have a bad cane, as we shall get no further. You will perhaps remember that, some ten or twelve years ago, the Legislature passed an Act providing for the erection of a pioneer central factory, but that Act was vetoed by the Colonial Office. If at that time we had had Sir Daniel Morris working with us and he had expressed himself as clearly as he has done to-day, Mr. Chamberlain would not have disallowed that Act, and to-day we should have had full knowledge as to whether or not central factories were the best things for our industry. (Cheers.) It gives me great gratification, therefore, to hear Sir Daniel Morris strike the true note with regard to central factories. I think it is the first time that Sir Daniel Morris has in public expressed himself so clearly as he has done to-day on the subject of central factories, and I am certain, if we should make another attempt to establish a central factory in this island, that, with Sir Daniel Morris to help us, we shall not meet another rebuff. (Loud cheers.)

The resolution was then put to the meeting and carried unanimously.

On the motion of Mr. Sealy, seconded by Mr. Smith, another resolution was adopted to the effect that a copy of the first resolution be forwarded to his Excellency the Governor with a request that it be sent to the Secretary of State for the Colonies.

DATE PALMS AT TRINIDAD.

The consignment of date palms received from Algeria have made excellent growth, and bid fair to arrive at a fruiting stage within reasonable time. It is hoped that they will prove on fruiting to be an acquisition to our list of West Indian grown fruit. The fungus which was found on them on arrival does not appear to do serious harm, although it apparently checks growth in dry weather to some extent. (Annual Report on the Trinidad Botanical Department, for 1904-5.)



SEA ISLAND COTTON IN ENGLAND.

The *Cotton Trade Journal*, of Savannah, Georgia, for November 11, 1905, has the following note from its Manchester correspondent on the position of Sea Island cotton on that market:—

Sea Island yarn shows no change and no improvement can be noted. English spinners are still indifferent to the Savannah market and are waiting for the accumulation of stock. The weathered condition of the crop, especially in Florida, is very marked. The very small section spinning Carolinas is fairly busy, but as we have said in previous notes, West Indian cotton is a formidable competitor, and unless planters and factors moderate their pretensions respecting prices, a moderate demand only is likely to occur. The action of the Charleston people in deciding that 14d. is to be the minimum price for Fully Fine Carolinas is not regarded seriously, for this is just the cotton which suffers in competition with West Indian.

ST. VINCENT COTTON INDUSTRY.

The Agricultural Superintendent at St. Vincent has forwarded to the Imperial Commissioner of Agriculture the following report, dated November 11, on the cotton industry in the island:—

As mentioned in my last report, picking is now in full swing on most of the estates, and cotton of good quality is being stored. So far, the lint appears to be quite up to last year's standard, but, on this point, conclusive information should shortly be obtained, as several samples were sent on by growers last mail to Mr. E. Lomas Oliver.

During the last few days, I have visited with Mr. Fraser the cultivations at Diamond, Brighton, Villa, etc., for the purpose of ascertaining if there were any 'rogues'; a few plants of the Marie Galante were seen and pulled up. If this type is pulled up now, there is no danger, as the plants are only just commencing to flower, whereas the Sea Island plants have already set most of the bolls of the first crop and are ripening up rapidly.

I have also visited Mustique and was much interested in what I saw. This island, as you are aware, is owned by Messrs. J. H. Hazell, Sons, & Co., and for a good number of years has been devoted entirely to the raising of stock; last year, however, about 10 acres of Sea Island cotton were put in, and the results obtained were very encouraging, the yield being much higher than on the other estates owned by the same firm at St. Vincent; besides this, the cotton was considered to be one of the best lots sent on and realized top prices.

This year about 20 acres have been planted, and, on the whole, the outlook is good. At the time of my visit picking

was in full swing and there was every promise of a heavier return than last year. I found a few 'rogues' in the cultivations and had them pulled up and destroyed. Next year it is proposed to put in a much larger area still and I inspected the areas to be planted and gave advice on their selection. No serious diseases were seen. Some damage had been done to the leaves of the plants by a small beetle, specimens of which I forwarded to you some time ago. This beetle can be readily controlled by the usual methods. There was a little anthracnose, but not enough to cause much damage to the crop.

As mentioned before in other reports, there is no reason why paying crops of Sea Island cotton should not be grown in the St. Vincent Grenadines, the conditions as to rainfall being much better than at St. Vincent.

It should also be possible, with careful selection, to grow there seed for planting at St. Vincent and other places, as the cotton can be completely isolated. Then, again, the type of plant would tend in time to be much hardier when grown under the conditions obtaining in these small islands than that grown here.

The chief drawback is the labour question, it being difficult to get labour except at a price often far in excess of its value. At Mustique, of course, there is not this difficulty, as Messrs. Hazell can control the labour, but in Bequia there is this drawback to cotton cultivation.

So far, both at St. Vincent and the Grenadines, the leaf-blister mite has done little damage, scarcely any being found. I put this down to the complete destruction of the old cotton plants at the beginning of the year and the disinfection of the new seed with carbon bisulphide and corrosive sublimate. Two cases which tend to prove this have come under my notice: one where an old cotton plant had grown up in a field of newly planted cotton, the other being outside the cotton factory. In the first case the old cotton plant had badly infected several young plants around it in the field, and in the second, all the seedlings of self-sown non-disinfected seed that came up near the cotton factory were badly affected. This tends to show that the leaf-blister mite is carried with the cotton seed.

Weather conditions have retarded the work of picking during the last week, but if the weather now holds fine there should not be much injury done to the crop.

Soil Inoculation for Alfalfa. It is desired to correct an error which occurred in the publication of the report on an experiment carried out at the Agricultural School at Dominica in inoculating the soil for alfalfa. (See *Agricultural News*, Vol. IV, p. 341.) The heights of the alfalfa plants were given in feet: these should be read as inches.

AGRICULTURAL SHOW AT TOBAGO.

The Curator of the Botanic Station at Tobago has forwarded the following report on the combined annual schools' and peasant proprietors' show, held in that island on November 15 last:—

SCHOOL SHOW.

The third annual school show was held on the 15th. in the spacious market shed, Scarborough, Tobago. The schools exhibiting numbered twenty-four, and the entries were 441; being an increase of eighty over that of the preceding show.

The exhibits of vegetables were, on the whole, of good quality, and there were good exhibits of cucumbers, tomatoes, herbs, and native vegetable products.

A special feature of this show was the large number of extracted oils and also good samples of Sea Island cotton.

In the section for plants a few good examples were shown; also some budded plants.

The show was a very creditable one, and the increase in the number of exhibits shows that interest is taken in school gardens in Tobago.

PEASANT PROPRIETORS' SHOW.

The peasant proprietors' show was the second annual one. This was held in the market enclosure under a bamboo structure, 54 feet by 24 feet. The interest taken in this show is apparent from the increase in the number of exhibitors and of exhibits.

In the vegetable classes, ground and native provisions were well represented. The following exhibits were worthy of mention: Cacao nibs, cacao pods, chocolate, starches, coffee beans, tomatoes, shaddocks, oranges, bananas, golden apples, and herbs; oils and lime juice also formed a good exhibit. Special mention should be made of the numerous and good exhibits of samples of Sea Island cotton.

This portion of the show was under the charge of the officers of the Botanic Station.

From the Botanic Station the following exhibits were sent (not for competition): Sea Island cotton, grown from seed in four months and four days; budded oranges, spineless limes, grafted mangos; also plants in pots.

PRIZE HOLDING SCHEME FOR GRENADA.

A scheme for prize holdings among the small cultivators of cacao is in course of being established at Grenada. The objects and provisions of the scheme are fully set forth in the following extract from a letter, dated November 28, 1905, addressed by the Imperial Commissioner of Agriculture to the Colonial Secretary, Grenada:—

It will be observed that this scheme has been drawn up after consultation with the leading members of the planting community; it was discussed at the meeting of the Agricultural Experiments Committee on the occasion of my recent visit to Grenada, and it was discussed and agreed upon at a general meeting of the Agricultural Society held on the 24th. instant. In its present form, it may be regarded as the result of careful consideration on the part of the agriculturists of the colony and of the Imperial Department of Agriculture.

The object of the scheme is to stimulate greater attention being devoted to their holdings by peasant cultivators of cacao with the view of increasing the total exports of the colony. A similar scheme has been in successful operation at Jamaica, and the results there have shown that

the money spent in connexion with it has been well invested in the general interests of the island.

In the first instance, following the advice of the Agricultural and Commercial Society, the scheme will be put in force in the parish of St. John as the one which contains the largest number of peasant proprietors in proportion to its size. A copy of the rules regulating the scheme is attached herewith.

The aggregate amount of the prizes to be offered in 1906 will be £25.

RULES GOVERNING THE PRIZE HOLDING SCHEME AT GRENADA.

1. Prizes will be awarded for the improvement of cacao cultivation during the year 1906.
2. Only persons holding not more than 5 acres of land cultivated in cacao are to be allowed to compete.
3. The holdings entered for competition are to be situated within the parish of St. John.
4. The prizes are to be allotted in three classes:—
1st. class—holdings not over 5 acres and not less than 3 acres of cacao.
2nd. class—holdings not over 3 acres and not less than 2 acres of cacao.
3rd. class—holdings not over 2 acres of cacao.
5. No person is to compete in more than one class, but may select any class for which he, or she, can qualify.
6. Prizes are to be given in the parish of St. John as follows:—

CLASS I.						
1st. prize	...	...	...	...	...	£4
2nd.	„	...	...	...	...	3
3rd.	„	...	...	...	...	2
						£9
CLASS II.						
1st.	„	...	...	...	...	£3
2nd.	„	...	...	...	...	2
3rd.	„	...	...	...	...	1 10
4th.	„	two of 15s. each				1 10
						£8
CLASS III.						
1st.	„	...	...	...	...	£3
2nd.	„	...	...	...	...	2
3rd.	„	...	...	...	...	1
4th.	„	four of 10s. each				2
						£8
						£25

7. In judging, the following points will be considered:—(i.) General condition of the holding as regards cleanliness of cultivation. (ii.) Pruning. (iii.) Forking and draining. (iv.) Manner in which the pods are removed from the tree in reaping. Prizes may be given for cultivation in progress, provided it is, in the opinion of the judges, sufficiently advanced to admit of being judged.
8. It shall be competent for the judges to withhold any or all of the prizes if the holdings entered for competition are not considered of sufficient merit.
9. Three months' notice at least is to be given before judging commences, and the decision of the judges, in all cases, is to be final.
10. Entry in writing, stating the class in which it is intended to compete, must be given by competitors before March 1, 1906, to the Secretary of the Agricultural Society, or an officer of the Agricultural Department.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. - A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

A short review of the available information in regard to the bud-rot disease of the cocoa-nut palm is given in the editorial in this issue.

On pp. 372-3 will be found a report of the proceedings at a meeting of the Barbados Agricultural Society on November 17, at which a discussion took place in regard to the sugar-cane experiments carried on at Barbados. The Imperial Commissioner of Agriculture addressed the meeting on the subject of central factories.

The report on the cotton industry at St. Vincent, published on p. 374, shows that the position of the industry is, on the whole, satisfactory.

Particulars are published on p. 375 of a scheme that has been drawn up for awarding prizes for peasant holdings at Grenada.

Under the head of 'Insect Notes' information is given relative to a caterpillar which has been doing considerable damage to cocoa-nut and other palms in British Guiana. (See p. 378.) On the same page will be found notes on the insects that have appeared in the cotton fields in Barbados during 1905.

The extracts from official reports from Jamaica, which are published on p. 379, indicate that there is considerable activity in agricultural matters in that island.

Jaffa Oranges.

An inquiry has been made whether forms of the true Jaffa orange are grown in the West Indies. This is a matter of interest to all who are concerned in the cultivation of citrus fruits.

The Imperial Commissioner of Agriculture would be glad to receive information from those who possess true Jaffa orange trees, and also specimens of the fruit, to be addressed to the Head Office of the Department at Barbados.

Medals For Cotton Growers.

In reference to the paragraph on this subject that appeared in the *Agricultural News* of October 21 last, it may be mentioned that a telegram has been received from Sir Alfred Jones, K.C.M.G., announcing that gold and silver medals for competition amongst cotton growers in the West Indies have been ordered. They will be exhibited at a banquet to be given at Manchester by the British Cotton-growing Association on December 11 next. Sir Alfred Jones has expressed his wish that the medals should be awarded under the direction of the Imperial Commissioner of Agriculture and entirely with the object of extending the cultivation of Sea Island cotton on right lines. It is probable that silver medals will be offered for competition for the best seed-cotton at the Agricultural Shows to be held up to March 31 next. The gold medals, on the other hand, will be reserved and offered for competition generally amongst growers who have shipped the largest quantity of cotton (per acre or otherwise), who have obtained the highest prices, and who have shipped such cotton to the British Cotton-growing Association.

Trade and Agriculture in Jamaica.

The Annual Report of the Collector General in Jamaica for the year 1904-5 shows that there was a considerable decrease in the value of the exports during the year. This shrinkage in output is found principally in the following items: cocoa-nuts, coffee, ginger, oranges, sugar, rum, honey, and logwood.

Increases are shown in respect of pimento, logwood extract, and tobacco (leaf, cigars, and cigarettes). The output of bananas was 1,100,496 stems greater than in the preceding year, but the value was £71,052 less.

It is pointed out that the export figures 'taken by themselves show little or no progress, but when the qualifying factor of the greatly reduced prices obtained for some of our principal products is taken into consideration, claim to appreciable progress is fairly established.'

The Collector General expresses his opinion that there is visible already good growing out of the evils of the experience with the hurricane of 1903. New life has been instilled into agriculture and it is believed that a lasting lesson in thrift has been taught and learnt. The extracts from the reports of the collectors for the several parishes, reproduced on p. 379, are of interest in this connexion.

Coffee Market.

Attention is drawn in the October issue of the *Bulletin of the Department of Agriculture, Jamaica*, to the fact that the rate of exchange with Brazil has gone up in nine months from 12*d.* to 17*d.* per milreis. This will have the effect of increasing the cost, reckoned in sterling, of growing coffee in Brazil, and therefore tend to reduce production. Consequently, higher prices may be expected for coffee in the world's markets.

The increased consumption of coffee and a diminution of supplies from South America are likely to combine to bring about a better outlook for coffee in the course of a few years. By this improvement Jamaica planters might profit if they were to extend the area in coffee cultivation; for coffee planted now would come into bearing in about four or five years.

Cultivation and Curing of Tobacco.

The most recent addition to the pamphlet series issued by the Imperial Department of Agriculture is a pamphlet on the Cultivation and Curing of Tobacco, which has been published with the view of generally encouraging the cultivation of this product in the West Indies. It is mainly based on information originally published in the *Bulletin of the Department of Agriculture, Jamaica*.

Tobacco cultivation is one of the most promising industries in Jamaica. For some years a useful series of experiments in tobacco production has been carried on at the Hope Experiment Station, and these notes are a record of some of the experiences gained thereby. They form a simple and reliable guide to the various details of tobacco growing and curing.

A section of this pamphlet is devoted to the cultivation under shade of Sumatra tobacco for cigar wrappers, which appears to offer prospects of a fairly remunerative character.

Jamaica Tobacco for the Navy.

In a letter addressed to the Under-Secretary of State for the Colonies, dated October 21, 1905, the Secretary to the Admiralty states that, with the assistance of Mr. F. V. Chalmers, the Admiralty obtained a supply (1,508 lb.) of leaf tobacco from Jamaica, for trial in the Navy; but, as it transpired that this tobacco by itself was not suitable for pipe smoking, and that there is not, at the present time, any colonial-grown tobacco suitable for blending with it, arrangements were made for it to be blended and manufactured with a quantity of Virginian-grown tobacco, the proportion being 1,508 lb. of Jamaican to 5,075 lb. of Virginian. This preparation is now undergoing trial in the fleet, and the results of the experiment will be communicated in due course.

It is hoped that, should this preparation meet with the approval of the sailors, a great impetus will be given to tobacco growing in the West Indies.

Every effort will have to be made to see that a regular and constant supply be forthcoming to meet the demand that would arise from this source. This is a matter to which the most careful attention must be paid both by growers and merchants in order to establish the industry on right lines.

Fuzziness of Sea Island Cotton Seed.

In an interesting report on the above subject, the Agricultural Superintendent at St. Vincent mentions that, in dealing with upwards of 32,000 lb. of Sea Island cotton seed, considerable variation in fuzziness was noticed in the seed from different estates, all of which were supplied with, and grew, only Rivers' seed.

Mr. Sands expresses the opinion that this fuzziness is decided, more or less, by local climatic conditions. This is a point upon which the interchange of seed within the island is likely to afford useful information.

It is important to observe that the price of the lint was not affected by the fuzziness of the seed from which it was obtained, the lint from all the estates mentioned in the report realizing 17*d.* to 18*d.* per lb.

Exports of the Philippines.

According to the *Consular Report* on the Philippine Islands for 1904, the total quantity of Manila hemp exported during the year was 121,637 tons, valued at £4,183,835. There has been a large increase in the production of hemp in recent years, but this is apparently attributed to the unsettled state of the islands (the natives neglecting rice cultivation for hemp stripping), and is not likely to continue.

Sugar has shown a steady decline for the past three years. The exports of leaf tobacco have remained fairly steady; the total quantity exported during 1904 was 18,640,612 lb., of the value of £197,904. The value of manufactured tobacco exported was £203,846.

The copra trade has steadily increased, while that of coffee has practically disappeared, and it is not likely that coffee cultivation will again be taken up until some means have been found of controlling insect and fungoid pests.

Pine-apple Juice.

The Imperial Commissioner of Agriculture having received a request for directions as to the preparation of pine-apple juice, an endeavour has been made to obtain some information on this point. There do not appear to be any records of actual experiments having been made for the purpose of ascertaining the best method of extracting and preserving the juice, nor of attempts to place the juice upon the market.

Dr. Cousins writes that attempts were made in Jamaica, but apparently with little success, to start a trade in sliced pine-apples and in pulp. The former were preserved in a solution of sodium bisulphite. He suggests that the juice might be extracted by pressing slices of pine-apples in a cider press. The addition of a little calcium bisulphite ($\frac{1}{2}$ per cent.) would serve to preserve the juice for shipment.

In a communication on the same subject, Dr. Watts points out that sterilizing by heating would not be satisfactory, as the flavour of the pine-apple would be lost. The use of salicylic acid might be suggested, but this is objected to by health authorities. Sulphurous acid or sulphite of soda might be tried, but its success is doubtful as its flavour is objectionable if freely used.



INSECT NOTES.

Cotton Insects in Barbados.

The season of 1905 has been an abundant one for insects in general. Cotton fields on certain estates were seriously attacked by cutworms which cut down the young plants. The use of a poison bait proved a very efficient check where it was given a thorough trial.

On one estate early-planted cotton (June and July) was so severely attacked that it was thought advisable to replant entirely. A poison bait made of 25 lb. of bran and 1 lb. of Paris green, thoroughly mixed together and stirred to a thick mash with molasses and water, was applied, a small handful being used at each hole, and the seed put in at the same time. When the plants grew there was practically no indication of the presence of the cutworm. The cost of this treatment was from 20c. to 24c. per acre.

On a few estates the cotton has suffered from the attacks of the cotton worm and a considerable amount of Paris green has been used. It was early noticed, however, that, even when the leaves of the cotton were badly eaten, very few caterpillars were to be seen and these were not quite like those of previous years. Many planters also noticed that no pupae were to be found this year, while in previous years in any field where the caterpillars had been plentiful many pupae were found in the leaves.

Caterpillars were obtained by the Agricultural Superintendent from estates in different parts of the island and a portion of each lot was sent to the Imperial Department of Agriculture, and as many as possible were reared to maturity. From this test not a single specimen of *Aletia argillacea* was procured, the moths that emerged proving to be all of one kind, but not *Aletia argillacea*. Recently, however, a few specimens of this species have been reared from caterpillars found in a cotton field in St. Philip's parish.

The cotton worm of 1905, in Barbados, is smaller than the caterpillar of *Aletia argillacea* and lacks the characteristic dark stripes along the back. It hides during the day in the bracts at the base of the flower and boll, and the pupa is found in the ground. The moth itself is smaller than *Aletia argillacea*. The forewings are greyish with greenish reflections, crossed by fine, wavy, light lines and lack the light spots so characteristic in *Aletia argillacea*; the hindwings are slaty-grey with distinct, light borders. Paris green has been found as effective in dealing with this insect as with *Aletia argillacea*.

The cotton aphid has appeared in a number of fields, but the natural enemies of this insect have in nearly every case proved sufficiently efficient to prevent serious injury.

The red maggot has been destructive in only very few instances. On account of the habit of this pest of living and feeding under the bark of the cotton plant, it is difficult to deal with. Cutting out and burning affected plants and branches seems to be the only remedy at present. Great care should be exercised to prevent the plants becoming bruised or broken, as any abrasion of the bark seems to offer opportunity for the entrance of the insect.

Cocoa-nut Caterpillar in British Guiana.

A report by the Government Botanist of British Guiana on a caterpillar which attacks the leaves of cocoa-nut and other palms in that colony has recently been issued. The following is a summary of the report:—

The insect has been identified from specimens sent to the Bureau of Entomology of the U.S. Department of Agriculture as *Brassolis sophoræ*, Linn. The eggs of this insect are laid, in batches of 100 to 150 or more, on the stem or under side of the leaves of the cocoa-nut, and have also been found on leaves of other plants. They are smooth, shiny, pink in colour, nearly round in shape, and about $\frac{1}{32}$ inch in diameter. The newly-hatched larvae are about $\frac{1}{8}$ inch in length, the full-grown larvae being about $2\frac{1}{2}$ inches long. They are very voracious feeders and their growth is rapid. They are gregarious, feeding and resting together in large numbers. When moving from place to place they move in procession, and when resting are massed closely together with the heads all in the same direction. They have a habit of joining together several leaflets of the palm to form nests in which the caterpillars rest during the day time, and from which they come out to feed at night.

The pupae are found on the under side of the leaves of the palms affected, and in many other locations where the caterpillars find suitable place to suspend themselves when about to pupate. The pupal stage lasts about a fortnight.

The butterfly is dark brown in colour, with a broad band of dark orange running obliquely across the forewings and a less conspicuous band of dingy orange on the hind wings, parallel with the outer border. The female butterfly spreads $3\frac{1}{4}$ to $3\frac{1}{2}$ inches, and the male $2\frac{1}{2}$ to $2\frac{3}{4}$ inches. The butterflies rest during the day and fly late in the afternoon.

The damage done is severe. Many cabbage palms have been killed, while many cocoa-nut trees have been stripped of their leaves. The damage is done by the caterpillars, which eat all the green parts of the leaf, leaving only the mid-rib and principal veins.

This insect has natural enemies which may assist in reducing its numbers. Various birds prey on it and parasites of the egg and the pupa have been discovered.

In dealing with this pest it is recommended that a sharp lookout be kept for the first appearance. The leaves attacked should be cut away and the pocket-like nests destroyed. The eggs and pupae should be collected and destroyed, while the butterflies may be collected as they rest during the day on the trunks of the trees. They may be destroyed by burning or by immersing in water which has kerosene on the surface, or in a mixture of water and carbolic acid, or chloro-naphtholeum. Cabbage palms growing near cocoa-nut plantations should be cut down when the attack is first noticed, as these methods are more difficult to apply to cabbage palms.

The report concludes with a note, regarding the killing of the eggs, from the Entomologist on the staff of the Imperial Department of Agriculture, who suggested that the following mixture might be useful: creosote oil, 5 parts; carbolic acid, 2 parts; spirits of turpentine, 2 parts; coal tar, 1 part. This mixture could be applied to the egg patches with a brush. It is said to have great penetrating power and will kill every egg it touches.

The writer of the report does not consider spraying likely to pay, since the cheaper and simpler process of cutting out and burning the nests has been found fairly successful in dealing with the pest.

AGRICULTURE IN JAMAICA.

The Annual Report of the Collector General in Jamaica for 1904-5 contains interesting information in regard to the exports of the island and the progress of agricultural industries. Discussing the statistics relating to land under cultivation, the Collector General remarks:—

It will be seen that the area registered as being in bananas has increased by no less than 11,014 acres, or 33 per cent.; cacao cultivation shows a satisfactory advance of 883 acres, or 19 per cent., and ground provisions 4,430 acres, or 4 per cent., while the area in canes, coffee, and cocoa-nuts continues to dwindle. It is a matter for regret that the more enduring, if less profitable, staples should be allowed to run in arrear, especially as there is no valid reason why an extension of area in canes and coffee should not keep pace with the extension of fruit cultivation. It is not necessary to abandon cane to take up fruit, nor to give the cold shoulder to coffee because yams are required on the Canal Zone. The increase in area in bananas is general throughout the banana-growing parishes. Among minor items the only point that calls for passing mention is the experimental cultivation of cotton in Clarendon and St. Catherine, where 18 acres are registered.

The following are extracts from the reports of the Collectors for several parishes:—

ST. MARY.

The cultivation of bananas has considerably increased, and the fruit trade has regained lost ground by leaps and bounds. In the September quarter of 1904-5, just thirteen months after the hurricane, the trade had practically recovered, and in the March quarter, the shipments actually exceeded those in the same quarter of 1903.

The prices paid for bananas in the open market during the last three months of the year were unusually low, unsatisfactory and disappointing; while contractors received from £7 10s. to £10 per hundred payable bunches, others were paid from £5 to £7 10s., and there was not the usual demand for six- and seven-hand bunches, thousands of which remained in the fields and rotted. I have no doubt the severe winter in the States was responsible for the state of affairs. Banana planters have not yet solved the problem of cultivating so as to bring their crop to maturity between the months of March and June; this does not seem to me an impossibility and in the near future, I am of opinion, the difficulty will be overcome.

Cacao cultivation is receiving careful attention and is being rapidly extended; already there are many large and well-established plantations; the spring crop now being reaped promises to be one of the best for some years. If the planters could establish (and there is no reason why they should not) as large an area under cacao cultivation as they have in bananas, they would have an excellent staple product to depend on in the event of destruction to bananas by strong winds or even an occasional hurricane.

ST. ANN.

The St. Ann Product Co. has erected a steam plant for the manufacture of corn-meal; the quality is very good, and the article is readily bought. There was a partial failure of the coffee crop. The St. Ann Product Co. and the Hon. H. E. Cox, who have up-to-date machinery for pulping the coffee, buy the berries from the peasantry. They then pulp and cure the product which realizes fairly remunerative prices in foreign markets.

WESTMORELAND.

Sugar farming by the small landowners on the lowlands is assuming a feature. Owing to the rise in the price of sugar abroad, some of the planters or managers of estates have given an impetus to this industry by purchasing from growers around their estates, hence extensive planting. From information received there are about 300 acres in cane cultivation by small settlers and owners of pens, and it is expected that next year will witness further planting: of the 300 acres under cane cultivation about 100 acres are cultivated by small settlers. The yield per acre is about $\frac{3}{4}$ to 1 ton of sugar, and if properly cultivated would be worth to the settler about £5 per annum. These estates have purchased for the period under review about 6,650 tons of canes, the prices obtaining being 10s. per ton for 50 tons and over, and 9s. per ton for lots under 50 tons. Rum canes are bought at about 4s. per ton. The yield of sugar has been very fine this year, taking as low as 1,700 gallons to make a ton of sugar; in consequence the rum crop will be small.

MANCHESTER.

The orange market has been a regular fiasco. As usual, at the beginning of the season, when this fruit was fetching a fair price abroad, the greed to become millionaires all of a heap affected many, and while a few of the more discreet and businesslike gentlemen of the parish were satisfied to send away a few boxes of good fruit, obtained by sending their agents armed with thread bags containing small coin to purchase the real article in small quantities of a dozen or half a dozen even, according as they came across them, and thus collect seventy or eighty boxes for which they realized a very fair profit, others, who sent their agents all over the parish who bought whatever they could lay their hands on, so long as the article bore any relationship to the 'citrus family,' were able to ship hundreds of boxes with the result that their golden dreams were turned into the lamentable fact that the orange market for this season at least was killed and they were out of pocket amounts, probably, reaching to three figures. The trade mark arrangement appears to be utterly useless so far as achieving the ends for which the law was enacted, from the fact that some shippers possess as many as five different trade marks.

CLARENDON.

There is a bright outlook in the Vere district for the sugar crop of 1905-6, the year under notice having been a seasonable one for cane cultivation which has increased considerably. In Upper Clarendon the small settlers are also increasing their cultivations and improving their methods, returning to the practice of putting up their sugar in barrels to meet anticipated demands in the foreign markets. A wealthy syndicate has purchased Morelands estate, intending shortly to erect new machinery for a central factory; peasant cane farming will, I learn, be an important feature in connexion with the undertaking. The outlook, on the whole, for 1905-6 is encouraging and better times may be expected for all classes, particularly if the peasants will put their shoulders to the pushing on faster in planting their produce. The proprietors of the cassava starch factory at Longville, on account of the small output from the present machinery, are erecting a much larger building with new machinery which will enable them to cope with the increased demand for their product. The cultivation of cassava has increased to 400 acres and it is expected the new plant is capable of turning out fully 500 tons. The factory employs 400 labourers daily.



GLEANINGS.

The sum of £213 17s. 11d. has been expended by the Government of Barbados in the destruction of the mungoose during the year 1904-5.

Rubber is by far the most important of the exports of the Ivory Coast, the total amount for the year 1904 being 1,531 tons valued at £261,400. (*Consular Report.*)

The annual Agricultural Show under the auspices of the Imperial Department of Agriculture will be held at Charlestown, Nevis, on Thursday, January 18, 1906.

The annual local Agricultural Exhibition for peasant proprietors and tenants on sugar estates at Barbados, organized by the Imperial Department of Agriculture, was held at Bushy Park estate on Tuesday, December 5.

It is stated that a company has been started in Porto Rico for the purpose of organizing a trade in drawn-thread work. It employs 700 girls. This product will be placed by the company on the New York market.

The Excise Report of the Comptroller of Customs for 1904-5 states that both the aggregate quantity and the value of the rum exported from British Guiana last year were less than in the previous year: quantity by 1,278,305 gallons, and value by \$188,197.

The *West India Committee Circular* of November 10 contains an illustration showing the decorations in Trafalgar Square, Barbados, on the occasion of the Trafalgar centenary celebration. It is from a photograph taken by Mr. Henry A. Ballou, B.Sc., of the Imperial Department of Agriculture.

In their Sea Island Cotton Report for October 28, Messrs. Henry W. Frost & Co., of Charleston, South Carolina, state: 'In South Carolina a larger proportion of the crop has been harvested than in previous years, and it is thought that the outturn will hardly equal the last.'

The operations of the branches of two American wood-cutting firms established at Belize, British Honduras, are responsible, according to the *Annual Report* on the colony, for the large increase in the output of mahogany and cedar during the last two years.

It is mentioned in the report of the Collector General in Jamaica that 'a small steam plant has been erected near May Pen for preparing umbrella and other sticks, and for manufacturing cart and waggon wheels and fruit boxes. Many thousand sticks have already been exported; the business is in its infancy and promises to do well.'

The Collector General reports a steady increase in the exports of minor products from Jamaica. This he regards as a wholesome sign, stating: 'The minor products belong distinctly to the people of the country and in the record of trade done therein is to be found the index to the condition of the peasant proprietors.'

The output of logwood extract from Jamaica has steadily increased during the last four years, from 5,149 packages of the value of £26,144 in 1901-2 to 9,560 packages of the value of £63,689 in 1904-5. In the same period the output of logwood has decreased from 41,107 tons (value, £103,795) to 29,972 tons (value, £75,679).

According to the Report on the Lands and Mines Department in British Guiana for 1904-5, the amount of balata obtained during the year was 497,999 lb. The decrease in output of 741,499 lb. was due entirely to cutting down of operations by the licensees on account of the depression in prices.

Reporting on a visit to the mission stations of Orealla and Epera, on the Corentyne River, British Guiana, Mr. Edgar Beckett, Agricultural Instructor, says: 'It is interesting to note that in the forests behind these missions *Vanilla planifolia*, the vanilla of commerce, grows quite luxuriantly and is really very common.'

The 'Coco-de-mer' or 'double cocoa-nut palms' are growing well, and now form stately plants, quite distinct and unique, even in their own section of the *Palmae*. There are three plants in a group near the Bungalow attached to Government House; and one in front of the Gardens. (Annual Report on the Botanical Department, Trinidad, 1905.)

In his report on the Trinidad Botanical Department for 1904-5, Mr. J. H. Hart mentions that a considerable number of notices were issued under the 'Agricultural Protection Ordinance' for the destruction of *Cuscuta* or 'Love vine.' (See *Agricultural News*, Vol. III, p. 185.) 'If regularly carried out, there is evidence that the Ordinance will prove sufficient to abate the nuisance, if not entirely to eradicate it.'

It is mentioned in a recent Circular of the Royal Botanic Gardens, Ceylon, that better yields will probably be obtained from maize 'if the male flowers of half—or even more—of the crop are removed while in the young state. The young male inflorescence can be easily withdrawn without damaging the plant. By this means a large saving of plant energy is effected, which may be diverted to the production of better leaf and fruit.'

A meeting of banana growers was held at Barbados on Friday, December 1, to receive the report of the deputation which waited upon the Chairman of the Royal Mail Steam Packet Co. After addresses by the President of the Agricultural Society, the Imperial Commissioner of Agriculture, and Captain Owen, it was decided to adjourn the meeting until the growers had before them definite proposals from the British West Indian Fruit Co. in reference to the purchase of bananas locally.

COPRA IN THE PHILIPPINES.

The following note on the copra trade is extracted from the *Consular Report* on the Philippines for 1904:—

While other exports, with the exception of hemp, show a tendency to decline, that of copra has steadily increased until now it ranks next to sugar in the average for the past five years. The average value of the copra exported during the five years ending 1889 was £15,350, for the period ending 1894, £96,661, and for the past five years, £531,878. The total quantity exported during 1903 was 181,117,084 lb., but it fell off during 1904 to 85,036,514 lb. The chief consumer of this product is France which takes more than two-thirds of the total; the next largest consumer, Spain, taking only a quarter as much. The following table shows the leading countries to which this product is exported:—

Country.	Value.		1900-4.	
	1885-9.	1890-4.	Quantity.	Value.
	£	£	lb.	£
United Kingdom ...	1,523	20,092	5,877,121	29,343
Germany ...	...	...	3,288,297	16,962
France ...	...	28,364	90,847,215	386,116
Spain ...	...	17,684	15,433,015	63,069
British East Indies	10,138	26,816	3,424,699	18,827

The production of this article appears to be steadily increasing. In the demand for its derivatives a market seems to be assured in which these islands should obtain a considerable share. Once the cocoa-nut trees begin to bear, their limit of productiveness does not seem to be definitely known, while the slight degree of cultivation and attention involved, and the simple methods required in the preparation of the product for market, make it an industry specially suited to this country.

HINTS ON MILKING.

The *Cyprus Journal* for October 1905 contains the following hints on milking:—

Milk is very easily affected by bad smells and it is one of the best mediums for the development of germs. The utmost care should therefore be taken that everything connected with the dairy be kept scrupulously clean. If the surroundings are dirty and give off evil smells, the milk is certain to become quickly tainted. The udder of the animal to be milked, whether cow, sheep, or goat, should, if dirty, be washed, and, if clean, it should at least be wiped. If this is omitted, dust and dirt fall into the bucket, and the milk is necessarily affected. It is much better to milk with dry hands. It is a mistake to commence milking into a bucket already containing milk. After each cow, sheep, or goat is milked, the milk should be poured into a large receptacle. One reason for this is that if an animal happens to have an injured udder causing garget, that is, slight mixture of blood in the milk, a few drops of this, if added to other milk, would spoil the whole lot. By commencing with an empty bucket the reddish colour is immediately noticed, and the bad milk can be kept separate from the rest.

A milker should always examine the first milk drawn from each teat.

Milk should be strained through a fine muslin or wire sieve immediately it is drawn. Milking utensils should be first washed with cold or tepid water, then scalded with

boiling water or steamed, and then rinsed out. They should then be drained, sunned and aired. Rusty milking utensils should never be used.

Milk should always be kept in the coldest place, which should preferably always be dry. Persons engaged in milking should always keep themselves clean and tidy.

ARBOR DAY.

St. Kitt's.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following brief report upon the celebration of Arbor Day in that island on November 9 last:—

I beg to inform you that Arbor Day was celebrated here on Thursday November 9, by a public function at which ninety mahogany trees were planted along the sides of the road known as the Macknight Road, leading from the Market westwards.

His Honour the Acting Administrator was present and delivered an interesting address on the objects of Arbor Day observance.

Trees were planted by the Acting Administrator, members of council, leading men in the town, by the boys of the grammar school, and the children of the primary schools of the town.

To enable the function to be held this year, I applied to the Town Board for a small grant of money which was spent in digging and preparing the holes and providing proper tree-guards for protecting the young trees.

Forty-eight trees of different kinds were also sent to eleven schools in the country districts to be planted by the pupils on Arbor Day.

At the request of Dr. Mason, Magistrate of Anguilla, forty trees of different kinds were sent to Anguilla for planting on Arbor Day. All these trees were raised at the Botanic Station.

Hawaii.

The *Pacific Commercial Advertiser*, of October 7, has the following reference to the first Arbor Day in Hawaii:—

The following programme for Arbor Day, which occurs on the first Friday in November, is submitted to the teachers in the public schools throughout the territory:—

The purpose and history of Arbor Day in the United States.....Principal
Song (about trees)Class
Recitation (about trees)Class
How trees should be planted and cared for.....Principal
Tree plantingClass
Song (about trees)Class
Recitation (about trees)Class
Tree plantingClass

This programme is only suggestive. Schools having a limited supply of water should act accordingly. Schools having no fenced space are directed to plant in boxes, that may be put indoors over night.

This is the first time Arbor Day has ever been celebrated in the Hawaiian Islands and it will be a brand new ceremony in all the schools. All schools desiring trees may secure the kinds suitable to their different localities from the government nursery by addressing Mr. David M. Haughs. Freight and carriage on such trees will be paid by the department.

RUBBER FROM ST. LUCIA.

The Agricultural Superintendent at St. Lucia forwarded to the Imperial Commissioner of Agriculture, in October last, samples of rubber obtained from trees of *Castilloa elastica* growing at the Botanic Station. These samples were sent to experts in London and New York for a report and valuation.

The following report, dated November 9, has been received from Messrs. Figgis & Co., London:—

We are favoured with yours of October 18, and samples of India rubber, for which we are obliged.

A. is nice-quality biscuit, well prepared, but a little damp and immature; value, about 5s.

B. similar to above, but darker and containing more moisture; worth about 4s. 6d.

C. is good black scrap, very slightly barky, dry, and in good condition—3s. 9d. to 4s.

The first two samples are rather immature and soft, which, possibly, can be avoided by more careful curing of the rubber. Both contain too much moisture, B. especially so, and they should be better dried. This may be possible by preparing the biscuits a little thinner than the samples you have sent. All three qualities will sell very well.

Messrs. Hecht, Levis, & Kahn, London, report on similar samples, under date of November 8, as follows:—

We have your favour of October 18, and also samples advised therein. These samples show rubber of very nice quality which will be readily saleable in this market. Sample A. we should value to-day at 4s. 9d. to 5s. per lb. Sample B., which is somewhat porous and not so well cured, at 4s. 3d. to 4s. 6d. Sample C. appears to be a very good quality of scrap rubber, but the sample is so small that it is difficult to judge what quantity of bark and other foreign matter would be in the bulk, but we should estimate to-day's value at about 3s. 10d. With regard to the biscuit rubber, we may say that the thinner you can make the biscuits the better, especially as, by making them thin, the rubber, as a rule, gets much better cured.

It may be of interest to publish also the following report by the Agricultural Superintendent at St. Lucia on the methods adopted in the preparation of these samples:—

Sample A.—The latex, after dilution with water and straining, received formalin at the rate of $\frac{1}{6}$ oz. per gallon, and was allowed to stand in a small tub for about thirty-six hours, when the liquor under the supernatant rubber was drawn off. The rubber was again diluted to a similar bulk, with water only, and allowed to stand for about forty-eight hours, after which time it was found that the rubber was only slightly granulated and not agglutinated into a mass of sufficient strength to be handled. After drawing off the water, the thick rubber cream was poured into a blotting-paper filter fitting into a flower pot, in the bottom of which was some fine sand; by this means the water drained away from the rubber, which, in about forty-eight hours, could be lifted out in the filter, and the greater part of the paper peeled off. On the rubber drying still more, any adhering particles of paper were washed off and the rubber finally dried.

Sample B.—As this non-agglutination of the rubber, when treated with formalin in my initial experiments, appeared to be a serious drawback to its cheap preparation, a trial was made without the use of formalin, and it was found that after treating the latex in a similar manner, but with the omission

of the formalin, the greater part of the rubber agglutinated readily on top of the liquor on standing for two days. After decanting the liquor and removing the agglutinated rubber, the small quantity of rubber which remained in the milky condition was washed into the tub receiving that day's tappings. By this means none was lost. The rubber which was removed in a spongy mass was well washed by kneading it in clean water; after allowing it to stand in several changes of water for a day, it was taken out, worked with the hands to remove as much liquor as possible from the pores of the cake, and dried with a cloth and exposed in an airy room. The samples prepared in the latter way were marked B. in the samples forwarded for report.

All the cakes of drying rubber require wiping every day to remove any moisture that may accumulate on the surface.

Samples A., after about five weeks' drying, were of a brown colour outside, but quite white inside.

Samples B., after about four weeks' drying, were of a dark-brown to a black colour outside, but quite white inside.

Samples C. were simply scrap rubber gathered from the incisions a day or two after tapping.

PRESERVING STEEL ARTICLES.

Mr. R. Radclyffe Hall, B.A., the Acting Island Professor of Chemistry at Barbados, has forwarded the following interesting report on experiments carried out to devise a suitable preparation for preserving steel articles in the tropics:—

I have for a long time been in want of a durable elastic (i.e. stretchable) and colourless coating for preserving steel articles from rust. I tried many preparations, solutions of resins and so on, without getting what I wanted; but this material seems to be in all respects satisfactory. I have put it on a palette-knife blade and find I can bend the blade double without cracking the varnish; it is if anything improved by exposure to the heat of the water bath; it will stand soaking in water for two to three hours without change and only shows a slight whitening after several hours' immersion; it is almost colourless when coated on steel. It will not, of course, resist either prolonged friction or the action of alcohol.

I send you the recipe in case you should care to publish it in the *Agricultural News*, as no doubt you have had applications for such a preservative.

The following is the recipe:—

Gum mastic	2 parts by weight
Gum sandarach	3 " " "
Gum elemi	1 " " "
Camphor	1 " " "
dissolved in about	20 " " " of strong alcohol.

The alcohol should be of 90 per cent. strength or over; the resins or 'gums' are shaken up in the alcohol until dissolved, which takes place quickly, and the solution allowed to settle for a day before decanting: it of course evaporates very rapidly and must therefore be kept tightly corked.

I found that 2 oz. of 'gum' mastic, 3 oz. of 'gum' sandarach, 1 oz. of 'gum' elemi, and 1 oz. of camphor dissolved readily in a whisky bottle full of alcohol such as can be obtained, before dilution, at the West Indian Rum Refinery, and is then of satisfactory strength.

Small articles to be coated all over are best dipped into the solution and drained and held in the air for a few moments while the alcohol evaporates: larger articles can be painted quickly with a soft brush.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of October has been received from Mr. J. R. Jackson, A.L.S.:—

With regard to West Indian products, the continued scarcity of grey Jamaica sarsaparilla is noted. The following are the chief features in other products of the West Indies:—

GINGER.

At the first spice sale, on October 4, there was a slow demand for all kinds, and nearly all the offerings were bought in at the following rates: Jamaica, of which 135 barrels were offered, 39s. to 46s. for common to fair; Cochin and Calicut were represented by 530 packages for which there was practically no demand. A week later much more activity prevailed, 15 barrels of Jamaica being sold without reserve at 48s. to 49s. for fair bright, while 800 packages of fair to good washed Cochin were disposed of at 19s. to 20s. On the 18th., there was again no demand. At the last sale, on the 25th., a few packages only of low-quality Jamaica were disposed of at 36s., and ratoon at 35s.; there was, however, practically no demand for any kinds.

NUTMEGS, MACE, PIMENTO, ETC.

At the first spice sale a few cases of nutmegs were sold at 11d. per lb. for 92's, some defective seeds being disposed of at 5d. to 5½d.; at the remaining sales during the month lower rates prevailed, but without much interest. At the early sale, Penang mace of ordinary quality was bought in at 1s. 4d., and fair pale at 1s. 6d. per lb.; on the 25th., 42 packages of West Indian were offered and sold at the following rates: ordinary to fair, 1s. 1d. to 1s. 5d.; good, 1s. 6d. to 1s. 7d.; low, 10d. to 11d., and pickings, 9d. per lb. Pimento at the commencement of the month was bought in at 2¾d. per lb.; a week later some 38 bags were offered and disposed of without reserve at from 2¾d. to 3½d., and at the last auction 42 bags were sold at 2¾d. for fair, and 2½d. for good.

Mombasa Capsicums of fair quality ranged at 28s. per cwt. and good at 34s. 6d.

ARROWROOT.

At the spice sale, on the 11th., the only offering was 13 barrels of good manufacturing St. Vincent, which were sold at 1½d. On the 18th., 180 barrels of St. Vincent were offered, 68 of which sold without reserve at about previous rates, and at the last sale some 35 barrels realized from 1½d. to 1½d.

SARSAPARILLA.

At the drug auction on the 12th., the quotations for Lima-Jamaica were from 1s. to 1s. 2d. per lb. for sea-damaged to good sound; 1 bale of good red to palish native was sold at 10d. On the 25th., 6 bales of grey Jamaica were offered, 1s. 6d. per lb. being given for 2 bales of good fibrous, and 1s. 4d. for 2 bales of fair. Three bales of fair reddish to pale native Jamaica sold at 1s., and dull red at 10d. Three bales of Honduras were offered and held at 1s. 3d. per lb.

KOLA, TAMARINDS, OIL OF LIMES, ETC.

Good bright West Indian kola was offered at the sale on the 11th. and bought in at 4d. per lb.; 3 barrels of bright, but smaller, realized 3½d., and mouldy from 2½d. to 3d. A week later, 7 packages of dried Grenada found buyers at from 2½d. to 3¼d. per lb., and on the 25th. some dark to

slightly mouldy West Indian were disposed of at from 2¾d. to 3d. per lb., in addition to 13 bags of dried West Indian, which realized from 3d. to 3¾d. per lb. On the 11th., 3 casks of dark dry West Indian tamarinds were sold without reserve at 7s. 6d. per cwt. in bond. At this auction 11 cases of fair West Indian distilled oil of limes sold at 1s. 5d. per lb., but a fortnight later the price had dropped to 1s. 4d. On the 25th., 8 cases of good West Indian oil of pimento were offered and bought in at 6s. per lb. Annatto seed is reported as being very scarce, ordinary bricky Ceylon, offered in the early part of the month, being bought in at 6d. per lb., and good bright Madras, at the end of the month, was held at 7d. An offer of £17 10s. per ton for quillaja bark, recently referred to in these notes, has been refused.

AGRICULTURAL CO-OPERATION.

A bulletin entitled 'Agricultural Co-operation' has recently been issued by the Natal Agricultural Department. Reference is made to the action taken by the Irish Department of Agriculture in sending a deputation to Denmark to inquire into the bacon-curing industry. The following extract is of interest:—

The valuable report on 'Co-operative Associations and rural conditions in Denmark,' submitted by the members of this deputation, unanimously attributed the whole of the success of the Danish farmers to co-operation. So strongly impressed were the members of the deputation and the officials of the Irish Department of Agriculture by their investigations, that steps were immediately taken to organize the agricultural industry of Ireland on the same lines, with the result that Ireland has, in its turn, also forged ahead. The growth of co-operative bacon curing in Denmark, from 1888, when it practically started, to 1902, was stated by the deputation to be as follows:—

	No. of factories.	No. of Pigs killed.	Value.	Average Price per pig.
1888	1	23,407	£57,000	£2 9s. 0d.
1902	27	777,232	£2,500,000	£3 4s. 6d.

It will thus be seen, as regards that one industry alone, what an enormous advance was brought about by co-operation, and an interesting fact to be noticed is that, whilst the number of pigs dealt with had so enormously increased, yet the average price per pig had risen from £2 9s. to £3 4s. 6d. The increase in average price per pig was progressive each year.

PARA RUBBER IN BRITISH GUIANA.

In his Annual Report for 1904-5 the Commissioner of Lands and Mines in British Guiana makes the following reference to the prospects of Para rubber in the colony:—

Special attention has been paid of late to the possibilities of obtaining Para rubber in the colony, and during this year a rubber expert, Dr. Bovallius, has made some careful prospections in the north-western district and on the head-waters of the Ireng and Potaro rivers for this rubber, and, I am pleased to report, with fair success, a true rubber tree having been found growing healthily, though not in large numbers. It has now to be ascertained whether, with careful attention to cultivation and surroundings, the tree can be induced to grow in as large numbers as the bullet tree. The experiment of planting these trees is being tried on a grant held by Messrs. Dinkluge and Young in the Aruka river, and so far they are doing well.

MARKET REPORTS.

London,—November 10, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 10, 1905; and 'THE PUBLIC LEDGER,' November 4, 1905.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 21/- to 60/- per cwt.
ARROWROOT—St. Vincent, 1 $\frac{3}{4}$ d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4 $\frac{1}{2}$ per lb.
BEES'-WAX—£7 10s. to £8 per cwt.
CACAO—Trinidad, 51/- to 54/- per cwt.; Grenada, 43/- to 51/- per cwt.

CARDAMOMS—Mysore, 7 $\frac{1}{2}$ d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.
COTTON—West Indian, medium fine, 6'55d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15 $\frac{1}{2}$ d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 7/- per bunch.
GRAPE FRUIT—10/- to 12/- per box.
LIMES—3/6 to 4/6 per box.
ORANGES—Jamaica, 5/6 to 9/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, 38/6 to 43/- per cwt.
HONEY—17/- to 22/- per cwt.; fine pale, set in tins 28/-.
ISINGLASS—West Indian lump, 2/3 to 2/7; cake, 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/6 per lb.
Distilled Oil, 1/4 to 1/5 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fine heavy pale, 1/9; fair pale, 1/4 to 1/5; red, 1/2 to 1/3 per lb.

NITRATE OF SODA—Agricultural, £10 17s. 6d. per ton.
NUTMEGS—56's, 2/-; 74's, 1/-; 90's, 8 $\frac{1}{2}$ d.; 105's, 6 $\frac{1}{2}$ d.; per lb.
PIMENTO—Fair, 2 $\frac{3}{4}$ d. to 2 $\frac{1}{2}$ d. per lb.

RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 15/- per cwt.; Muscovado, 14/6 to 15/6 per cwt.; Molasses, 11/- to 16/- per cwt.

SULPHATE OF AMMONIA—£12 17s. 6d. per ton.

Montreal,—October 18, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$24.00 to \$25.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c per lb.
GINGER—Jamaica, unbleached, 7 $\frac{1}{2}$ c. to 10c per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.
ORANGES—Jamaica, \$5.50 per barrel, duty paid.
PIMENTO—Jamaica, 5 $\frac{1}{4}$ c. per lb.

SUGAR—Grey crystals, 96°, \$2.08 to \$2.25 per 100 lb.
—Muscovados, 89°, \$1.60 to \$1.75 per 100 lb.
—Molasses, 89°, \$1.35 to \$1.50 per 100 lb.
—Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—November 10, 1905.—Messrs. GILLESPIE BROS. & Co.

BEES'-WAX—31c. per lb.
CACAO—Caracas, 12c. to 12 $\frac{1}{2}$ c.; Grenada, 10 $\frac{1}{2}$ c. to 11c.; Trinidad, 11 $\frac{1}{4}$ c. to 11 $\frac{3}{4}$ c. per lb. Jamaica—No quotations.

COCOA-NUTS—Jamaica, \$27.00 to \$28.00; and Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica ordinary, 8 $\frac{1}{4}$ c. to 10 $\frac{1}{2}$ c. per lb.
GINGER—Jamaica, 8 $\frac{1}{4}$ c. to 9c. per lb.

GOAT SKINS—Jamaica, 58c.; St. Kitt's, 49c. per lb.
GRAPE FRUIT—Jamaica, \$4.00 to \$6.00 per barrel; \$2.00 to \$3.00 per box.

HONEY—Jamaica, 65c. to 67c. per gallon (duty paid).

LIMES—No quotations.

MACE—27c. to 31c. per lb.

NUTMEGS—West Indian, 63's to 69's, 24c.; 70's to 80's, 20c.; 105's to 110's, 13c.; 115's to 130's, 10c. per lb.

ORANGES—Jamaica, \$3.50 to \$4.00 per barrel; \$1.75 to \$2.25 per box.

PIMENTO—4 $\frac{3}{4}$ c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3 $\frac{7}{8}$ c.; Muscovados, 89°, 2 $\frac{7}{8}$ c.; Molasses, 89°, 2 $\frac{3}{4}$ c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—November 25, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.50 per 100 lb.

CACAO—\$10.00 per 100 lb.

COCOA-NUTS—\$15.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.00 per 100 lb.

HAY—84 $\frac{1}{2}$ c. to \$1.60 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$2.75 per 100 lb.

POTATOS, ENGLISH—Canadian, \$3.03 per 160 lb.

RICE—Ballam, \$4.90 per bag (190 lb.); Patna, \$3.15 to \$3.25; Seeta, \$3.26; Rangoon, \$2.65 to \$2.75 per 100 lb.

British Guiana,—November 22, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 14c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—9c. to 13 $\frac{1}{2}$ c. per lb.

DHAL—\$4.40 per bag of 168 lb.

EDDOES—84c. per barrel.

ONIONS—Lisbon, 3c. per lb.

PLANTAINS—8c. to 24c. per bunch.

POTATOS, ENGLISH—\$2.25 to \$2.75 per barrel.

POTATOS, SWEET—Barbados, 72c. per bag.

RICE—Ballam, \$4.30 per 177 lb.; Creole, \$4.00 to \$4.10 per bag. (ex store).

SPLIT PEAS—\$5.90 to \$6.00 per bag (210 lb.).

TANNIAS—96c. per barrel.

YAMS—White, \$1.92; Buck, \$2.40 per bag.

SUGAR—Dark crystals, \$1.73 to \$1.85; Yellow, \$2.70 to \$2.75; White, \$3.75 to \$4.00; Molasses, \$2.00 to \$2.10 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—November 24, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.25 to \$11.50; estates, \$11.70 to \$11.75 per fanega (110 lb.); Venezuelan, \$11.50 to \$12.25 per fanega.

COCOA-NUTS—\$21.00 per M., f o b.

COCOA-NUT OIL—72c. per Imperial gallon (casks included).

COPRA—\$2.90 to \$2.95 per 100 lb.

DHAL—\$3.20 to \$3.25 per 2-bushel bag.

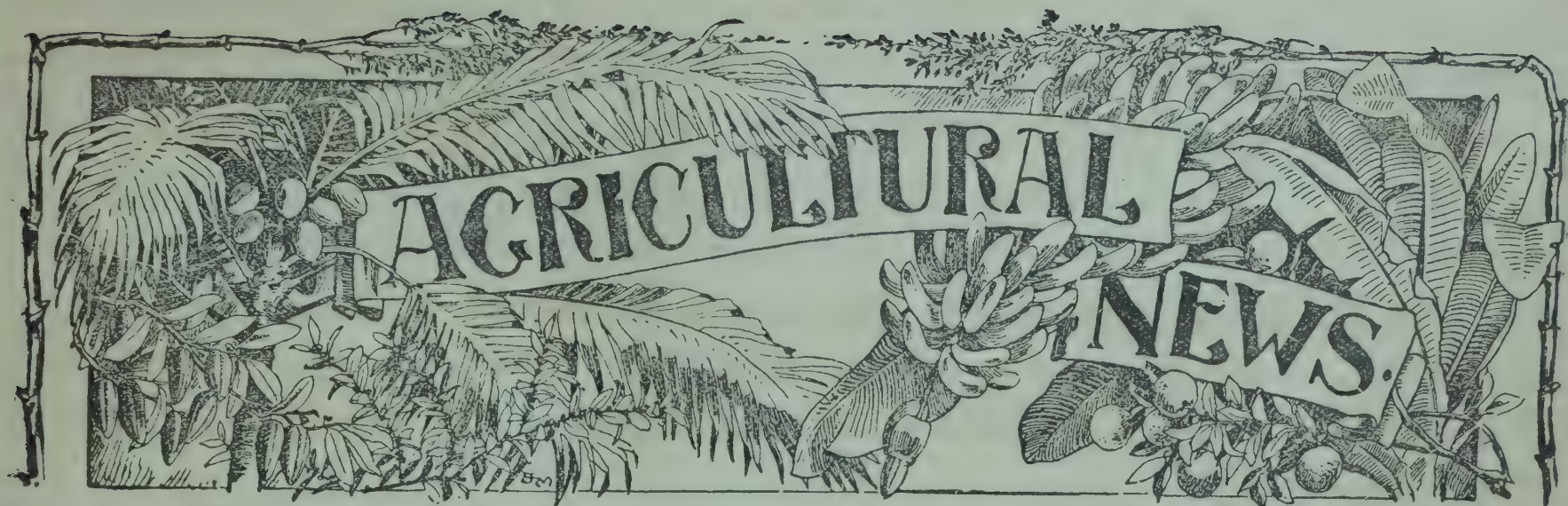
ONIONS—\$1.50 to \$1.70 per 100 lb. (retail).

POTATOS, ENGLISH—90c. to \$1.15 per 100 lb.

RICE—Yellow, \$4.25 to \$4.40; White, \$4.50 to \$5.60 per bag.

SPLIT PEAS—\$5.10 to \$5.25 per 2-bushel bag.

SUGAR—White crystals, \$4.50; Yellow crystals, \$2.75 to \$3.00; Molasses, \$2.75 to \$3.00 per 100 lb.



A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

Vol. IV. No. 96.

BARBADOS, DECEMBER 23, 1905.

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Selection of Cotton Seed in the West Indies.

IT is thoroughly well recognized by cotton planters in the Sea Islands that it is only by careful selection that the staple can be kept up to its present quality; in other words, seed

selection is inseparable from the success of the Sea Island cotton industry. It may therefore be realized that the methods adopted by the leading planters in the Sea Islands are of a careful and painstaking nature, so much so that they might be regarded as models for plant breeders throughout the world.

As stated in the *Agricultural News* (Vol. III, p. 69) 'the history of Sea Island cotton . . . serves us as an example showing how a tropical plant has not only been adapted to another climate, but at the same time the product has been brought to a very high pitch of perfection; the whole having been accomplished by selection, aided by good cultivation and manuring.' Seeds of this plant were taken from the Bahamas in 1785 and planted in Georgia. The first step was to secure, by planting only the earliest produced seeds, an earlier maturing plant. Having attained this, the planters started a very careful system of selection with the view of increasing the length, strength, and fineness of the staple. In this way the production of the finest-quality cotton in the world has been attained.

In an article in the *Yearbook* of the U.S. Department of Agriculture for 1902, Mr. Herbert J. Webber records a remarkable instance of improvement in length and abundance of fibre. In this case Egyptian seed was imported; the length of the fibres attached to the seed was only about 1¼ inches. This cotton was submitted to a rigorous course of selection with the result that, in two years, not only had the lint increased in abundance and uniformity, but also the fibres had reached, in some instances, a length of 1½

inches. Some remarkable results of a similar nature, brought about by the careful and systematic selection of Sea Island cotton, have been recorded in the *West Indian Bulletin* (Vol. IV, pp. 208-14), where another article by Mr. Webber is reproduced, in which a detailed description is given of the system adopted by the Sea Island cotton planters for improving their cotton by seed selection.

Reference to this article will show that each grower generally selects several plants each year from which to breed. The seeds taken from these plants are sown in a special plot, from which, in the following year, one or two plants are selected to supply seed for a similar small plot, which is again subjected to the same treatment, and so on year after year. At the same time each small plot supplies seed to plant a larger area, say, 5 acres, from which the general crop of the following year is planted. In this way the general crop of any one year has sprung from one or two plants selected from the small plot four years previously; at the same time there are always under observation a small plot, from which one or two individual plants are selected, and a 5-acre plot for supplying the seed for the general crop.

At a conference of the Commissioner and officers of the Imperial Department of Agriculture, held recently for the purpose of discussing the question of the selection of cotton seed for the next planting season at Barbados, it was decided to adopt a system based generally on the above lines. The several officers of the Department will be responsible for the selection of the best plants for seed on certain estates allotted to them.

The plants, after being selected in the field, are to be marked with strips of red cloth and have numbers attached to them. All the seed-cotton produced by these plants is to be specially picked by one picker and placed in separate bags, numbered to correspond with the plants. The several bags, duly numbered and secured, are to be forwarded to the Department in order that the weight of seed-cotton, the length of staple, proportion of weak fibres, and other characteristics may be fully worked out. The seed from the plants which are proved to have produced the largest quantity of the finest and strongest lint will be used next season for planting selection plots.

It may be mentioned that, in the meantime, for next year's general crop, the seed used will be carefully selected by the Department from estates which have produced the finest lint and obtained the highest prices.

The proprietors and managers of the estates are invited to co-operate fully with the Department in this matter, and to do all in their power to carry out the arrangements entered into between them and the officers in charge of the selection.

It is anticipated that these measures, which are proposed to be extended to the other islands, will, in time, ensure the production of a cotton plant pre-eminently suited to the special conditions existing in the West Indies.



SUGAR INDUSTRY.

Some Facts about Seedling Canes B. 147 and B. 208 at Barbados.

In the course of the statement read at the meeting of the Agricultural Society, held at the Planters' Hall on Friday, November 17 last, in continuation of the Report on the Sugar-cane Experiments for the season 1903-5, read at the meeting of the society held on Friday, November 3, 1905, Mr. Bovell, addressing the meeting, said he would like to make a few remarks with reference to the figures Mr. Cameron had been good enough to give him at the meeting that day fortnight. He had on that occasion mentioned the results obtained on an estate which he would designate as 'A.' both as plant canes for three years and ratoons for two years, and he had shown that, on the average for the three years as plants and two years as ratoons, B. 147 had given 431 lb. of sugar per acre more than the White Transparent. The estate to which he referred reaped something like 430 acres annually. At \$2.25 per 100 lb. for dark crystals (about the average price for the past three years) the value of the sugar obtained from, say, 430 acres of the B. 147, after deducting £2 10s. as the cost of manufacture, over the White Transparent, would have been about £520 per annum. In other words, it would mean that, under the conditions which prevailed, an estate reaping about 430 acres would make an extra profit of £520 per annum, if the estate were planted in B. 147, instead of White Transparent. Mr. Cameron had also been so good as to furnish him with figures from other estates, which confirmed those just given. On one estate, which he would refer to as 'B.,' plant canes of B. 147 had, on the average of the past two years, given 5,029 lb. of sugar, while the White Transparent had given 5,023 lb. As ratoons on the same estate for the same two years, on the average, B. 147 had given 4,245 lb. and the White Transparent 3,635 lb. of sugar per acre. So there was a difference in favour of B. 147 over the White Transparent of 616 lb. of sugar per acre on the average as plants and ratoons. On another estate, 'C.,' on the average for two years as plants and two years as ratoons, B. 147 had given 179 lb. sugar more than the White Transparent. On a third estate, 'D.,' on the average for two years as plants and two years as ratoons, B. 147 had given 383 lb. sugar more per acre than the White Transparent. He was very grateful, and he was sure his colleagues also were, to Mr. Cameron for

these figures, which confirmed on an estate scale what was found on the small experiment plots.

He would like to supplement what he had mentioned at the last meeting with regard to the good results obtained from the B. 208. As no doubt some of the members present knew, this cane was at present being cultivated in, amongst other countries, Jamaica and Queensland. Dr. Cousins, in his report on the Sugar-cane Experiments at Jamaica for the last year, says: 'B. 208 on a much larger area gave a return of 66.5 tons canes. The Bourbon gave 39.5 tons canes and Mont Blanc 33.8 tons per acre.' Further on in the report, he says: 'The outstanding features of the year's trials are the splendid qualities of B. 208 and the promising nature of the selected Jamaica seedlings.' In Queensland, Mr. Edward Grimley, in a paper on the 'Improvement of Plants' read before the Agricultural Conference held at Queensland last May, referring to B. 208, says: 'We have now a report from Messrs. Gibson, of Bingera, which gives a return of 69 tons, 6 cwt. of cane per acre, with 22.2 per cent. of sucrose and Brix. 23.9, or 21.45 per cent. of possible obtainable cane sugar, or over 14 tons to the acre. These results were obtained under irrigation, and the experiment plot was well manured. The average yield in Queensland per acre for the last seven years was 13.16 tons, so that B. 208 gave more sugar per acre than the average tons of canes per acre in Queensland.' In conclusion, Mr. Bovell said that planters in the red soils should cultivate more of the B. 208, so as to ascertain whether this cane is an acquisition or not. To do this, what was necessary was for a planter to grow, say, an acre of B. 208 in the same field with the White Transparent, or even half a field of each variety, taking care that the conditions in which the canes were planted were the same for both varieties. Each acre or half field could be reaped by itself, crushed separately, the juice measured, and a sample of each sent to the Government Laboratory, as he was quite sure Professor d'Albuquerque would be only too pleased to supply them with ready prepared bottles for the samples, and to furnish them with analyses of their samples.

In reply to a question from the President as to whether any one present desired to ask Mr. Bovell anything, Mr. Cameron said that for many years past, under the advice, and with the assistance, of Professor d'Albuquerque and Mr. Bovell, a system had been started on his estates for recording results of each day's work. At the end of the crop these daily records were tabulated, and the figures consequently were in no way estimates—they were absolute concrete facts—nothing less, nothing more. He had much pleasure in handing Mr. Bovell statements from three estates, giving records of results obtained for the last three years from each variety of cane planted on these three estates. At the same time he wished to make it absolutely clear that he was only giving his own experience of certain canes, as grown on the estates under his charge; he was in no way telling any one what canes they were to plant or not to plant. Before sitting down, he would like, on behalf of himself and of the proprietors of the estates he represented, to express publicly the sense of deep obligation which they all felt to Sir Daniel Morris and his Department, and more especially to Professor d'Albuquerque and Mr. Bovell, for the very great and valuable assistance and help he had received from their hands for so many years past, and for the kindness and courtesy with which they had invariably received all his applications for information. Personally he was of opinion that the whole sugar-growing community was under a deep obligation to Professor d'Albuquerque and Mr. Bovell for the light their valuable work had thrown on the matter of selection and cultivation of the sugar-cane.

Central Factories.

In reference to the address on the subject of central factories delivered by the Imperial Commissioner of Agriculture, at a meeting of the Barbados Agricultural Society held on November 17 last, which was published in the *Agricultural News*, Vol. IV, pp. 372-3, interest attaches to the following extract from a letter from Mr. L. Bert de Lamarre to the Hon. Sir Daniel Morris:—

I was a member of the first committee appointed here in 1894 or about that time, and you can read in the report of the committee that our views were exactly yours.

The factory at Antigua proves that, with sound people like Mirrlees, and dealing direct with them, factories can be established at £14 per ton of manufacturing power and give good results. Barbados has thrown away, and is still throwing into the fire, 40 per cent. of sugar. It is useless to grow the best canes if the same process is to continue.

In Trinidad, at my Tacarigua factory with double expressions and maceration, I obtained an extraction of 70 per cent., and I find that I ought to extract more. It is the only way to face the present state of the sugar market. We must make up in quantity for the shortage of prices now prevailing, and perhaps to continue, unless the syndicate of united growers on the continent decide, as proposed in October, to restrict their output in beets—copying the arrangements made between the nitrate producers. The sugar-cane industry here and elsewhere is the only industry which is satisfied to throw away 40 per cent., on the average, of the initial material they have to work with. The sugar-beet industry has no margin to work or to improve. When all is considered, we have a formidable margin of 40 per cent. which, if well handled, can save the cane sugar industry in general in the West Indies.

SISAL HEMP CULTIVATION.

The following note on the cultivation of sisal hemp is extracted from the Annual Report of the Department of Agriculture, Queensland:—

The cultivation in this country of the plant from which the fibre known by the name of sisal is extracted having been practically established, it may be well, in order that those who are cultivating it may learn something of the opinions held concerning it in other countries that are similar to our own, to glance briefly at those opinions. The report of the Acting Governor of the Bahamas for 1903-4 states that the fibre industry has become firmly established, and that unless prices fall below expectations, it will progress in public estimation as a field for investors with small capital. It is the least precarious of all agricultural industries, and the plants are hardy and well able to withstand long droughts. The fibre product is capable of storage in bales for a length of time without suffering deterioration. The British Consul at Vera Cruz, in Mexico, says that the growers have become very wealthy (probably planters on a large scale are referred to). The exports from the Bahamas may be valued at about £40,000 per annum, and from the Mauritius at about £46,000, most, if not all, of which goes to the United States of America, which imported fibre in 1903 to the value of £2,657,888, at a cost of £30 12s. 6d. per ton. During 1904 the price rose to £35 per ton. Sisal is eminently suited to those parts of the country where the rainfall is limited, and where the thermometer does not fall below, say, 40°; and upon a limestone formation it will thrive better than in situations where that quality is absent.



WEST INDIAN FRUIT.

PLANTAINS IN BRITISH HONDURAS.

The Report on the Botanic Station in British Honduras for 1904 contains the following interesting remarks on the trade in plantains in that colony:—

Like the yam in Jamaica and the sweet potato in Barbados, the plantain forms the chief vegetable diet of the colony.

Besides the local consumption of plantains, a comparatively large number is shipped every week by the United Fruit Company's steamers to New Orleans.

The principal growers of this product are small planters, most of whom are to be found at Northern River.

Except the owners of the plantations, very few people have the opportunity of seeing these plantain fields, as the country between Belize and Northern River, where most of the plantains are grown, is somewhat isolated.

The export of plantains has increased nearly 50 per cent. within the last eight years, and I believe that if a special effort were made to popularize the product in the United States, the present output could be doubled.

A peculiarity about the plantain is that the ripe fruit can be dried, and in this way it will keep for weeks and bear transportation to a considerable distance.

COCOA-NUTS IN BRITISH HONDURAS.

The following is also extracted from the Report on the Botanic Station in British Honduras for 1904:—

The demand for British Honduras cocoa-nuts has been exceptionally good. High prices have been paid for cocoa-nuts all through the season. The trouble is we have not got enough to supply the demand. This demand for cocoa-nuts will most probably lead to the planting of more land with cocoa-nuts and the clearing of neglected trees.

The cocoa-nut palm is considered by most people here as being the hardiest of plants, because it will grow near the sea and stand the sea breezes, neglect, and ill-usage. A greater mistake has never been made, as, under good treatment, this grateful palm will produce so much more fruit. Cocoa-nuts will also grow inland for a considerable distance in this colony, in the south up to the foot of the hills, and, in the north, wherever there is rich soil.

The palm weevil affecting, to a certain extent, this product, seems to be regarded as being the only cause of the destruction of cocoa-nut trees, whereas they also die from the want of proper care and treatment. Nearly every cocoa-nut tree in a plantation or round a house is carelessly chopped during the weeding or at some other time. A chop on a palm immediately attracts insects and, therefore, helps to kill the trees.

MACHINE-WRAPPED ORANGES.

In reference to a machine in use in California for wrapping oranges, the *Journal of the Jamaica Agricultural Society* publishes the following extract from a Florida paper:—

The advent of California oranges into the market wrapped with labels bearing the stamp 'Machine-wrapped fruit; not handled by hand' makes information about the type of machine especially interesting.

The machine is attached to the end of the grader and receives the oranges direct. It is simple in operation, compact and perfectly automatic. It receives the fruit on an endless chain, attached to which are a series of cups, felt-lined and separated by rubber partitions. The wrappers are cut from a roll, after the manner of a perfecting printing press, and after being printed, are cut the desired size, when they are ready for the orange. A unique device twists the paper perfectly tight about the orange, which is held in place at the top by a rubber plunger, while the other end rests on a felt-topped rod. The ends of the orange are in this position, and so closely is the orange wrapped that it is believed that it will be practically impervious to moisture.

A feature of the machine that will appeal to packing-house men lies in the fact that a smaller-sized paper can be used than in hand-wrapping. Thus, a nine-by-nine wrapper would be used on the machine, while in hand-wrapping a ten-by-ten wrapper would be required. A saving of 20 per cent. of paper is claimed, as well as far superior wrapping. Another advantage would lie in the fact that no large stock of assorted wrappers would be required, since the machine can be adjusted to any size and the roll paper only would be needed. The printing of wrappers would also be done away with, since the printing is a part of the wrapping process.

To prove that the machine will not mar the skin of the fruit, eggs have been run through the machine and wrapped without cracking a shell.

The machine wraps seventy-two oranges a minute, or 40,000 pieces of fruit every ten hours. It would wrap a car-load in one and one-half days. For the ordinary packing house, five machines would be necessary to handle the fruit.

Practically all the packers in the city have inspected the machine, and all are enthusiastic over its possibilities.

With labour a scarce and high-priced commodity in California, this invention ought to be a great factor in making the citrus business pay better profits.

BARBADOS LOCAL AGRICULTURAL EXHIBITION.

The sixth annual local agricultural exhibition and show of stock was held by the Imperial Department of Agriculture on Tuesday, December 5, at Bushy Park plantation, St. Philip, which was kindly lent for the purpose by the attorney, Mr. A. A. Cameron.

In spite of the fact that the parish had, for a considerable portion of the year, suffered from a somewhat serious drought, the quality of the exhibits was remarkably good, although the number of exhibits was not quite as large as on former occasions.

The goats were distinctly good, and the prize sheep were much admired. Other animals in the live stock class were also of a better class than is usually found among small owners.

A marked improvement was noticed in the manner in which both the fruit and vegetables were exhibited this year. Flours and starches were well represented, and there were some excellent exhibits of cotton. As on former occasions, there was a class for school exhibits. The quality of these exhibits showed a decided improvement.

His Excellency Sir Gilbert Carter, K.C.M.G., after distributing the prizes, addressed the assemblage, expressing his pleasure at being able to attend the show and offering his congratulations on its success. The exhibits he had seen reflected credit on those who had produced them, and he hoped they would go on and achieve even better results. They owed a deep debt of gratitude to Sir Daniel Morris for the indefatigable manner in which he had been stirring them up and he advised them to take full advantage of Sir Daniel's advice and assistance.

The Hon. Sir Daniel Morris thanked those present for recognizing so cordially the work that had been done by the Imperial Department of Agriculture in connexion with these shows. He considered St. Philip deserved great credit for having done so well in spite of the dry weather that had prevailed. That parish was the leading parish in growing cotton. St. Philip was also noted for producing the best mutton not only in Barbados but in the West Indies. He suggested that more might be done: they might produce more turkeys and Guinea fowls and a larger number of sheep. Referring to the exhibits, he said those from the schools were better than at any previous show, and he desired to say that, if the schoolmasters of this island took a deeper interest in school gardens, the island would be greatly benefited. He wished to express their indebtedness to the Rev. Henry Daniel and Mr. Cameron for the use of the estate, and to the manager, Mr. Hutson, for his assistance. Their thanks were also due to the Committee, and especially to Mr. J. R. Bovell, than whom no one had worked harder to make these shows a success. He concluded by calling for three cheers for his Excellency and Lady Carter.

The following is a list of the Diplomas of Merit of the Imperial Department of Agriculture which were awarded:—

Sea Island cotton	...	Dr. C. E. Gooding, M.C.P.
do. (Peasants)	...	Mr. Philip N. Wilson.
Stool of cane B. 147...	...	Mr. E. L. Skeete, Summervale.
Sugar-canes	...	Mr. Hutson, Bushy Park.
Brown filly	...	Mr. M. R. Edwards, Hampton.
Avocado pear	...	Mr. Samuel Manning.
Dwarf bananas	...	Mr. W. N. Vaughan.
Collection of peppers...	...	Mr. F. Lythcott.
Plants grown by school children	...	Mount Tabor School. Society School.

ROOT-ROT OF LOGWOOD TREES.

A report by Mr. F. S. Earle (now Director of Agriculture in Cuba), on some diseases of economic plants in Jamaica, reproduced in the *West Indian Bulletin* (Vol. IV, pp. 1-9) contains notes on a root-rot of logwood trees, which was examined by him in the western end of the island in 1902.

There it appears that these trees were dying in considerable numbers through a fungus mycelium invading the roots and thence spreading upwards into the stem, between the bark and the wood. Although fructifications of this fungus were not found, the mycelium presented characters, which enabled Mr. Earle to place it amongst the *Hymenomycetes*. This group of fungi includes the 'edible mushrooms' and also species which are deadly enemies to various trees in forests and fruit gardens.

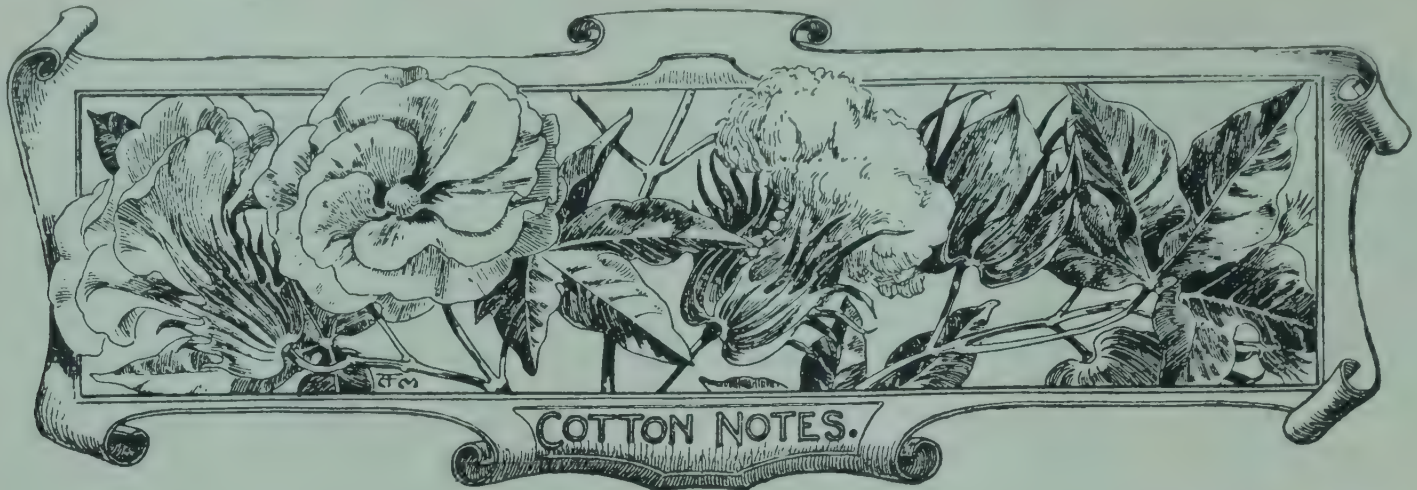
The logwood disease is found in trees in different kinds of soils and under varying climatic conditions, but, even where moisture and drainage appear to be perfect, large areas present a diseased appearance.

Lately, Dr. Emile Bucher, of the West India Chemical Works, Jamaica, has written in the local press, pointing out that in the Westmoreland district the disease is rapidly spreading. Dr. Bucher reminds growers of the serious damage that was done in European vineyards by *Phylloxera*, a pest which was thought to be harmless at first, but ultimately brought ruin to many of the wealthiest vine-growers. This logwood disease is a contagious one, spreading by means of the mycelial strands in the soil in constantly widening circles and, unless steps are taken to check its spread, serious damage to the logwood industry in that part of the island may ensue.

To prevent the spread of the disease the following remedies have been recommended: (a) where the disease is confined to small, definite patches, a trench 3 feet deep should be dug outside the diseased area in order to prevent further spread of the mycelium on to the roots of healthy plants; (b) where the disease is widely disseminated, the only means of checking its spread is to clear the infested tract entirely of logwood, marketing that which is matured and putting the land into cultivation of other crops. The necessity for the destruction of such a seat of infection is shown by the marked tendency of the disease to spread from these centres.

Dr. Bucher, who is an authority on logwood, rendered much assistance and information to Mr. Earle during the investigations in Jamaica, and, therefore, when he advises growers to take the necessary steps to prevent further spread of the disease, he does so in order that the logwood industry may not suffer in the same way as the European wine industry did through neglect of proper protective measures.

Blue-flowered Yam Bean. Mr. A. J. Brooks writes from the Agricultural School at Dominica in regard to the blue-flowered variety of the yam bean (*Pachyrhizus tuberosus*). The ordinary yam bean grown in Dominica produces blue flowers and brown seeds, while seeds received from Porto Rico were of a red colour and produced white flowers. To test the relative cropping powers of these two varieties, Mr. Brooks planted two equal-sized plots, and he reports on the experiment as follows: 'When flowering time came, I was surprised to find that the seed saved from the former white variety produced blue flowers. Having gathered and sown the seed myself, there can be no doubt as to any mistake having been made with regard to the mixing of the seed previous to sowing.'



BRITISH COTTON-GROWING ASSOCIATION.

Handkerchiefs for the Prince and Princess of Wales.

The British Cotton-growing Association, through their President (Sir Alfred Jones), forwarded to Marlborough House the other day two boxes of handkerchiefs made from West Indian cotton for their Royal Highnesses the Prince and Princess of Wales. The handkerchiefs were made from cotton grown from American Sea Island seed in Barbados and St. Vincent, which, when manufactured, has a natural gloss, and is said to be very much superior to similar cotton grown in the United States. Sir Alfred Jones has received the following acknowledgement:—

Marlborough House,
Pall Mall, S.W.,
October 12, 1905.

Dear Sir,—I have received to-day the two boxes containing handkerchiefs made from West Indian cotton, which the British Cotton-growing Association have been kind enough to offer for the acceptance of the Prince and Princess of Wales.

I am directed to convey to you and the members of the association the best thanks of their Royal Highnesses for these specimens of manufactured West Indian cotton.

Their Royal Highnesses are interested to know that the cotton grown from Sea Island seed is of such superior quality, and they trust that the efforts of the association in other parts of His Majesty's dominions may be as successful as they have been in the West India Islands.

• Believe me, dear sir,
Yours very faithfully,
(Sgd.) ARTHUR BIGGE.

SEA ISLAND COTTON MARKET.

The Sea Island Report of Messrs. Henry W. Frost & Co., dated Charleston, South Carolina, November 18, has the following note on the Sea Island cotton market:—

Islands.—The above sales of 303 bales reported, were a lot of fine, sold for export at 23c. Since the close of the exchange, further sales have been made, 50 fully fine 24½c. for France, 50 fine 23c. for England. The market is quiet, with very limited demand, and the planters' crop lots have been very much neglected. The factors are asking full prices, but they seem to be disposed to meet the views of the buyers if their bids approximate the holding prices. The

receipts continue large, but the planters report it is largely due to the very early maturity of the crop.

Floridas.—Were in good demand taking the daily offerings at our quotations, and the market closed firmer but not notably higher.

A week later the same firm reported:—

Islands.—The sales this week of 400 bales consisted of 50 bales of planters' crop lots and 350 bales of fine, fully fine, and extra fine at 23c. to 26c., and since the close of the exchange export 200 bales of fully fine have been sold at 24c.

The market closed very firm at 23c. for fine, 24c. for fully fine, and 26c. for extra fine, with factors not anxious sellers but rather disposed to hold for higher prices.

Messrs. W. W. Gordon & Co., of Savannah, Georgia, report as follows under date November 17:—

The Sea Island market during the past week was quiet. The demand was principally for the best grades, which were not offered freely, and for low grades, which were bought at quotations. Intermediate grades were neglected.

WEST INDIAN COTTON INDUSTRY.

The following is an extract from the first Annual Report of the British Cotton-growing Association for the year ended August 31, 1905. This portion of the report deals with the progress made in establishing the cotton industry in the West Indies:—

Excellent as were the results obtained in 1904, the cotton produced in 1905 is still more successful. The Hon. Sir Daniel Morris, the Imperial Commissioner of the West Indian Department of Agriculture, took especial pains to obtain a good supply of a first-class quality of Sea Island seed, and those planters who used this seed have every reason to be satisfied, for the cotton produced is even superior to that grown on most of the best Sea Island plantations in South Carolina, and has realized 2d. to 3d. per lb. more than American-grown cotton. The spinners who have used this cotton have found it economical in working, and there is evidently a great future before those West Indian planters who have suitable land, and who will take sufficient care in cultivation and ginning in order to produce the best results. The best testimony to the excellence of the West Indian cotton is the exhibit of handkerchiefs manufactured from yarn spun from it. These goods, though not mercerized, have every appearance of silk, owing to the natural silkiness and gloss of the raw cotton. Although it is not desirable that the market should be overdone with cotton of this quality, there is now not the slightest doubt that, should a scarcity arise, or should there be any mishap to the American crop, we can depend on the West Indies

producing all that we require of the better qualities of cotton. Out of the total crop no less than 1,746 bales of a value of over £28,000 have passed through the association's hands this last season, and the planters are most satisfied with the price obtained.

The prospects for the coming season are equally good, for there will probably be an increase in the area under cultivation of from 30 per cent. to 50 per cent., and as most of the planters have now realized the importance of the use of carefully selected seed, there is every reason to look to a still further improvement in quality. St. Vincent and Barbados have been the most successful islands, the climate in the latter is the more suitable, but the soil in the former is very much superior. Good results have also been obtained in Montserrat, St. Kitt's, Nevis, Antigua, and other islands, but in Jamaica very little has been done. In addition to advantages for our spinners, the re-introduction of cotton cultivation has conferred an undoubted benefit on the West Indies, as it will enable planters to be less dependent on one single article of produce, viz., sugar. A small commission is now charged by the association on the cotton which is sent to them for sale, but it is fully recognized by the planters that it is well worth their while to pay this commission so as to ensure their cotton fetching a fair price in this market.

In addition to the great thanks which are due to the Hon. Sir Daniel Morris and to his staff for their untiring exertions, and to those Governors and other officials who have actively interested themselves in cotton growing, especial mention should be made of the invaluable services rendered by Mr. Lomas Oliver, a member of the council and a large user of Sea Island cotton. During his visit to the West Indies last winter he drew the attention of the planters to the defects in the quality of the cotton previously grown by them, and pointed out that it was only by the most careful cultivation, the most careful harvesting, and the most careful ginning and baling, that they could hope to realize a full price for their productions. Mr. Oliver visited most of the islands where cotton is being grown, and it is impossible to over-estimate the immense value of his visit, which was made at considerable personal inconvenience. The thanks of the members are also due to the executive of the Fine Cotton Spinners and Doublers' Association for enabling Mr. Oliver to place his services at the disposal of the association; nor would it be right to pass over without mention the great amount of time which another member of the council—Mr. Charles Wolstenholme—has so willingly given in superintending the valuation and sale of the cotton. As many of the shipments have been in small lots of one or two bales, this work has been a heavy tax on Mr. Wolstenholme's time, and, in addition, he has most readily given his services for the valuation of the hundreds of samples which are sent to the association from time to time from all parts of the British Empire.

The association have also sent out ginning and other machinery to the planters, and this is now being supplied on a commercial basis, but with easy terms of repayment and at a moderate rate of interest. An oil plant has recently been sent to Barbados at a cost of about £1,600, and this should prove of great advantage to the planters, as it will enable them to obtain a good price for their seed locally.

The association made a special grant last year of £300 towards the services of an additional expert, who has travelled throughout the various islands telling the planters what to do and when to do it, and helping them in all cases of difficulty. His services have proved so valuable that the council have decided to renew the grant for another year.

TOGGENBURG GOATS.*

The following account of this valuable breed of goats is extracted from the *U. S. Monthly Consular Reports* for September:—

To meet the requests of many American correspondents desirous of information regarding the value of the Toggenburg goat, Consul-General Peters, of St. Gall, Switzerland, transmits the following report, which was prepared at his request by Mr. Wissman, Director of the Cantonal Department of Agriculture of St. Gall:—

Toggenburg is in a long and fertile valley of the Thur, and is a district within the Canton of St. Gall, long famed for its goats. The milk of the goat is rich in quality, and keeps quite as well as cow's milk. It sells for 3·5c. to 3·8c. per litre (1·0567 quarts). These goats breed at a year old, the time of gestation being five months. The food in summer consists of grass and shrubs, but in winter, if the milk is to continue rich in quality, a small quantity of grain and hay must be given, and the temperature of the stall should be kept at from 57° to 62° F.

FEEDING AND HERDING.

In regard to the amount of pasture land required for the support of this animal, it is computed that from six to eight goats will need as much as one cow, and that one man can manage from forty to fifty goats. Generally speaking, the milk of the cow is more popular, but for children the goat's milk is in greater demand, as tuberculosis is hardly ever found in these hardy animals. The milk of the goat makes an excellent cheese and fairly good butter; but as to the latter, the milk of the cow retains its pre-eminence. The meat of the young goats, from five to twelve weeks old, is considered a great luxury. Indeed, it is often mistaken for venison, and sells for from 29c. to 39c. for 2·1 lb. This compares very favourably with the average price received in Switzerland for beef, which is 33c. to 37c. for 2·2 lb.

The average clip on long-haired goats is about 4·4 lb.; the hair is not very marketable, but is used in some instances for ropes, which are very strong and defy the action of water. The skins are worth from 29c. to 58c. each, but the finest and best bring as much as \$1·35 each.

If well cared for, these animals will give milk from their first to their tenth year, when they decrease in flow and finally dry up. Ordinarily, they will produce milk for eight months in a year. The price of these animals is higher in the spring than in the fall, but the average for a good one, from one to three years old (male), in the fall, is \$9·65 to \$19·30. Females of the same age bring \$7·72 to \$9·65; four-year-olds bring as high as \$13·51.

It may be mentioned that several goats of the Toggenburg breed have been introduced into the West Indies by the Imperial Department of Agriculture. 'Bruce,' a handsome billy, and a fine milking goat ('Pauline'), of the same breed, were imported in January 1903. As stated in the *Agricultural News* (Vol. IV, p. 216), 'Pauline' died some few months ago. She had, however, given birth to seven kids. 'Bruce' has two sons—'Wallace' at Halton estate, Barbados, and 'Paul' at St. Vincent.

* The name of this breed of goats has hitherto appeared in the *Agricultural News* as Toffenburg. It appears that the correct spelling is Toggenburg.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

A system of cotton seed selection, based generally on the lines of that in practice in the Sea Islands, is being adopted in the West Indies. This matter is discussed in detail in the editorial in this issue.

Information is published on pp. 386-7 in regard to the results that have been obtained at Barbados with seedling canes B. 147 and B. 208.

A brief report appears on p. 389 of the sixth annual local agricultural exhibition and show of stock, held at Bushy Park, Barbados, by the Imperial Department of Agriculture on December 5 last.

Cotton growers will read with interest the extract which is published on pp. 390-1 from the Annual Report of the British Cotton-growing Association, dealing with the progress made in establishing the cotton industry in the West Indies.

Notes will be found on p. 394 in reference to insects affecting tobacco in Cuba and the occurrence of black blight in Grenada.

Recommendations with regard to the treatment of orchard soils in the tropics are discussed on p. 395.

An interesting account of what is being accomplished at Antigua in connexion with agricultural education appears on p. 397.

On the same page information is published in regard to exhibitions to be held in Canada in 1906.

Manurial Experiments with Cacao at Dominica.

The last issue of the *West Indian Bulletin* (Vol. VI, no. 3) contains a paper on manurial experiments carried out with cacao at Dominica by the Hon. Francis Watts, C.M.G., and Mr. Joseph Jones, Curator of the Botanic Station. These experiments, which were commenced in 1900, have already yielded some valuable results.

Five plots were treated as follows: (1) no manure; (2) basic phosphate and sulphate of potash; (3) dried blood; (4) basic phosphate, sulphate of potash, and dried blood; (5) mulched with grass and leaves. All the manures used proved beneficial. In 1905 the no-manure plot yielded 19¾ lb. of wet cacao per tree; the addition of phosphate and potash resulted in an increase of 2¼ lb. per tree. With dried blood the yield was 24½ lb., while the combination of dried blood with phosphate and potash brought the yield to 28¾ lb. per tree, being a gain of 9 lb. over the no-manure plot. This points to the necessity for general manuring in cacao cultivation.

Sea Island Cotton in the West Indies.

In the *U. S. Monthly Consular Reports*, p. 209, for the month of September last, there appears the following:—

'Consul Clare of Barbados writes that the efforts to grow Sea Island cotton in the West Indies are not as promising as the cotton world had been led to believe by those who thought that cotton that was indigenous to the West Indies would surely thrive in those parts.'

Following this are extracts from a report by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, which, it is assumed, justifies the conclusions arrived at in the statement quoted above.

Mr. Ballou's report appears on p. 262 of the current volume of the *Agricultural News*, and may be easily referred to. It was one of a series that dealt exclusively with the undesirability of ratooning cotton. It expressed no opinion whatever on the general prospects of cotton growing in these colonies.

We would point out that the Consul's statement, which has been quoted and commented upon in several English and West Indian newspapers and accepted as correct, has taken us by surprise. As a proof that it is erroneous, we cannot do better than refer our readers to the extract from the Annual Report of the British Cotton-growing Association published on pp. 390-1. This shows that the cotton industry in the West Indies is steadily extending and there is no doubt as to its ultimate success wherever the conditions of the soil and climate and the labour supply are favourable. The industry is practically only three years old. The exports during the nine months ended September 31 last amounted to 1,024,283 lb. of the estimated value of £42,545. With continued good prices the value of the exports for next year (1906) should not fall far short of £100,000.

Manurial Experiments with Sugar-cane at Barbados.

A summary of the results of the experiments with varieties of sugar-cane carried on at Barbados during the season 1903-5 was published in the *Agricultural News*, Vol. IV, p. 355. It may be of interest to review briefly the results of the manurial experiments.

These results confirm those obtained in previous years. They indicate that an ordinary application of farmyard manure, together with artificial manure, is more effective than a very large application of farmyard manure without artificial manure; also that the application of nitrogen both to plant canes and ratoons, is followed by a profitable increase in the yield. The application of sulphate of potash was generally profitable. On the other hand, phosphatic fertilizers either had no effect upon the yield or caused a diminution.

Rubber in Hawaii.

A press Bulletin (No. 13), issued by the Hawaii Agricultural Experiment Station, contains notes in regard to the chief rubber-yielding plants, more especially as to the possibility of their successful cultivation in Hawaii.

It is considered unlikely that the climate of Hawaii would prove suitable for the Para rubber tree; for a similar reason, it is doubtful whether the cultivation of *Castilloa elastica* should be attempted on more than an experimental scale.

The Ceara rubber (*Manihot Glaziovii*), on the other hand, finds the climate of Hawaii quite suitable; it makes rapid growth in Hawaii, thriving from sea-level up to 2,500 feet. As this tree will stand a moderate tapping at three years, comparatively early returns may be obtained. A company has already planted 100,000 seeds of this species, and expects to have half a million growing within another two years.

The Ceara rubber would appear to offer the most favourable prospects for a rubber industry in Hawaii.

Agricultural Scholarships.

The Agricultural Scholarships for the Leeward and Windward Islands, of the annual value of £75, in connexion with the Imperial Department of Agriculture, and held by A. H. Boon, of Antigua, and G. O. M. O'Reilly, of St. Lucia, will be vacated at the end of the current year.

Both scholars have successfully completed a two-years' course in Agricultural Science, and a satisfactory report has been sent in by the Acting Head Master of Harrison College on their conduct and progress during that period.

With the view of filling the vacancies thus caused, it is proposed to hold an examination of candidates who fulfil the required conditions, in each of the Windward and Leeward Islands early in January next. Full information may be obtained on application at the Government Offices in the islands concerned. The last day on which applications can be received is Thursday, December 28 next.

Shade-Grown Tobacco in Jamaica.

As was briefly stated in the last issue of the *Agricultural News*, a section of the pamphlet (No. 38) on the Cultivation and Curing of Tobacco, just issued by the Imperial Department of Agriculture, is devoted to the cultivation under shade of Sumatra tobacco for cigar wrappers.

The experiments that have been carried on for some years at the Hope Experiment Station have shown that cigar wrapper tobacco equal, if not superior, to Sumatra can be grown in Jamaica. The cost of production has been placed at 2s. to 2s. 2½d. per lb. Samples of the leaf were estimated by an expert to be worth 6s. per lb.

Although these figures are liable to revision with wider experience in Jamaica and elsewhere, it is evident that the cultivation of this type of tobacco would leave a good margin for profit.

Mr. J. V. Chalmers, the expert who visited Jamaica last year for the purpose of reporting on the prospects of the industry, considers that the cultivation of shade-grown tobacco should be extended in Jamaica, as he is confident that it can be carried on very profitably.

Detailed instructions as to the cultivation of this tobacco under shade will be found in the pamphlet.

The Trade Pendulum.

In an interesting article in the *Journal of the Jamaica Agricultural Society*, entitled the 'Trade Pendulum,' the writer discusses the ups and downs to which different branches of trade are subject. Figures are quoted to show that each branch of trade experiences 'booms' for a few years, which are almost invariably followed by periods of depression. Logwood, coffee, pimento, annatto, and other products are cited as examples.

While these market fluctuations are inevitable, the trouble lies in the rush into a particular form of cultivation that follows a period of high prices for that product. The increased production, sooner or later, causes a drop in prices; with the result that the cultivation will have to be dropped by all except those who can produce the article cheaply. Now, cheap production must mean, among other things, that the right conditions of soil, climate, etc., have been secured for the crop.

In view of keen competition, diversified agriculture, it is urged, is necessary; but, further, land must be kept up to the highest pitch of cultivation. Each planter must carefully consider for which products he can secure the most suitable conditions.

The writer of the article advises the coffee planter in Jamaica to keep live stock for the sake of their manure and to grow oranges. The cacao planter has his bananas; he should also plant rubber trees as a permanent shade, as well as cocoa-nuts. The pen keeper has usually oranges, pimento, and logwood; according to the district, cotton, coffee, and other crops will be useful accessories.



INSECT NOTES.

Tobacco Insects in Cuba.

Bulletin No. 1 of the Estacion Central Agronomica de Cuba deals with the insect pests and fungoid and other diseases of tobacco in that island.

The insects dealt with in this bulletin are much the same as those that have been found troublesome in the Lesser Antilles, such as the tobacco worm, cutworms, flea beetle, and the cigarette beetle which attacks stored tobacco.

The tobacco worm in Barbados is *Protoparce celeus*, while the Cuban species is said to be *Protoparce carolina*. The remedial measures in use in Cuba are the same as in Barbados, which are hand-picking of the worms on the leaves and, occasionally, the use of Paris green.

Several species of cutworms are reported, for the control of which a poison bait is recommended similar to that recommended in the *Agricultural News*, Vol. IV, p. 378.

The flea beetle (*Epitrix parvula*) is the same species that attacks tobacco leaves in Barbados. Paris green is recommended for this pest also.

The foregoing are the principal pests of growing tobacco in Cuba. Clean cultivation is strongly recommended as a general measure in all cases of insect attack. Paris green is used in Cuba as a spray in a mixture of 1 lb. in 100 to 150 gallons of water, or dry, in a mixture of 1 lb. of Paris green to 100 lb. of a dry powder, such as flour or slaked lime. Although there does not seem to be any danger to the consumer of the tobacco from the use of Paris green, it is recommended that care be exercised not to apply more than is necessary, and not to apply any for at least a month before harvesting the leaves.

In dealing with the cigarette beetle (*Lasioderma serri-corne*) in stored tobacco, carbon bisulphide or hydrocyanic gas fumigation is recommended, and these have been found not to injure the quality of the tobacco.

Black Blight in Grenada.

In a report to the Agricultural Experiment Committee, Grenada, Mr. R. D. Anstead, Agricultural Superintendent, deals with the nature and control of the black blight which is so prevalent in that island.

The report reviews the relationship between the scale insects attacking certain trees and the fungus growth (*Capnodium* sp.) which finds suitable conditions for growth in the excretions of these insects.

The plants enumerated as most commonly infested by the black blight in Grenada are mango, bread-fruit, sapodilla, guava, and rose-apple. The scale insects which are most commonly followed by black blight are given as the star scale (*Vinsonia stellifera*), the mussel scale (*Mytilaspis citricola*), and the mealy shield scale (*Protopulvinaria pyriformis*).

It is pointed out that scale insects rarely attack cacao and nutmegs, although cases are known in Grenada of such attacks, and that wild and uncultivated plants are frequently attacked and furnish a source from which the infestation may spread to cultivated plants of certain kinds.

The remedial measures recommended in Mr. Anstead's report are: (1) maintaining of cultivated plants in the best possible condition of growth and vigour; (2) clean culture; and (3) the application of insecticides. The following formula is given for preparing a suitable insecticide, which has been used for some time by the Entomologist on the staff of the Imperial Department of Agriculture:—

Six (6) ounces of the best rosin are finely powdered and added to 3 pints of crude oil (Barbados tar) and heated until all is dissolved. Four (4) ounces of naphthalin are then added and 6 lb. of whale oil soap, and the heating continued until the mixture is homogeneous. One (1) pound of this mixture is made up with 10 gallons of water and used as a spray. The rosin must be of the best quality, or trouble is experienced in the clogging of the nozzle of the sprayer.

This mixture may be used for spraying, or plants may be washed with it. When no spraying outfit is available, a small brush may be used to apply the mixture and to dislodge the scales.

The report also recommends concerted action on the part of all members of the agricultural community in dealing with this matter, and suggests that some form of legislation may be necessary to deal with cases where owners are negligent and allow their plants to become breeding places for scale insects and a source of infection to their neighbours.

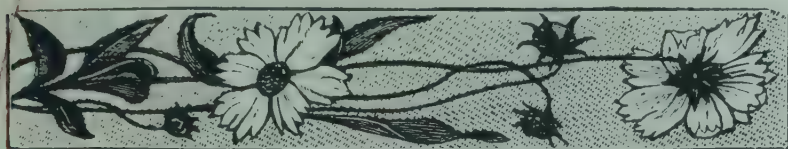
In dealing with large trees badly infested with scale insects and black blight, it is recommended that such trees be lopped as close as possible, the cuts tarred over, and the whole thoroughly coated with a good lime wash.

BASIC SLAG.

The following extract from an article on basic slag, in the *Journal of the Board of Agriculture* (Great Britain), for November, is likely to be of interest to West Indian planters:—

Basic slag is a by-product in the manufacture of steel and its composition is not regulated by the manufacturer as is the case with, say, superphosphate. Iron ores contain irregular quantities of phosphorus (the substance which gives to the phosphate of lime found in bones and some other manures its value as a fertilizer), and the object of the steel-maker is to get rid of all the phosphorus in the iron. To effect this the iron is melted in contact with limestone, which extracts the phosphorus and forms a slag. This, when ground to a fine powder, is basic slag, which may vary very considerably in quality, the usual contents being 30 to 40 per cent. of insoluble phosphate, though there may be as little as 22 per cent., or as much as 45 per cent.

The Irish Department, in their leaflet dealing with basic slag, point out that there is nothing in the appearance of basic slag which gives the slightest indication of the percentage of phosphate of lime it contains, and recommend that the farmer should (1) stipulate when purchasing that he shall be supplied with a high-class slag; (2) insist on being furnished with an invoice on which are clearly stated (a) the percentage of phosphate of lime, (b) the fineness of grinding, and (c) the percentage of phosphate of lime soluble in a 2-per cent. solution of citric acid according to Wagner's method. There should be no difficulty in procuring from any reliable manure merchant basic slag which contains 40 per cent. of phosphate of lime and so finely ground that at least 80 per cent. of it will pass through a sieve having 10,000 holes per square inch, and in which at least 80 per cent. of the total phosphate of lime is soluble in a 2-per cent. solution of citric acid used according to Wagner's directions.



TREATMENT OF ORCHARD SOILS.

In the editorial in the *Agricultural News* of August 12, 1905 (Vol. IV, p. 242), the attention of planters was drawn to papers by Dr. Francis Watts, C.M.G., the Superintendent of Agriculture for the Leeward Islands, in reference to the question of the treatment of soils in cacao and lime plantations. The recommendations made by Dr. Watts in this connexion were criticized in the *Grenada Chronicle* by Mr. W. Malins Smith, who laid considerable stress on the importance of forking between the trees in a cacao field and deprecated the plan of allowing weeds to cover the land.

In reference to this criticism, Dr. Watts points out that in his first paper on this subject (see *West Indian Bulletin*, Vol. II, p. 96) the question is introduced in a tentative and by no means didactic manner. He continues:—

I endeavoured to reach general principles for various forms and stages of orchard work.

When, as normally happens, a cacao orchard becomes so covered by the growth of the trees that no undergrowth of weeds arises, it is obviously absurd to talk of cutting down the weeds which do not exist: but where weeds do grow, I hold that they may be properly used to maintain the fertility and tilth of the soil.

To Mr. Smith's specific question 'Where is the advantage of allowing weeds to absorb manurial ingredients from the soil and so to deprive the cacao trees of plant food for the purpose of returning the same ingredients later on?' I would reply that the advantage lies in the increase in the amount of organic matter and the consequent and subsequent increase in the amount of humus in the soil: an additional advantage lies in the fact that the weeds prevent loss of fine soil from wash during heavy rains.

It has been my intention to discuss the question of the special case of the treatment of cacao orchards where the overgrowth is so dense as to prevent the growth of weeds, but up to the present I have been too busy to do this. I may, however, remind you of the increased yield due to mulching in the case of the experiments on cacao in the Dominica Botanic Station.

Practical farming cannot be reduced to a formal set of rules; few occupations offer greater scope for the exercise of individual judgement than does farming. A practical planter would examine his soil and if he found it losing tilth under a system of weeding he would modify this, doubtless, by an occasional forking.

What I want to show is that in orchard work in these islands there is often a tendency to try to keep the spaces between the trees (spaces as yet unoccupied by trees, as in the case of young lime and orange orchards) free from weeds by constant weeding with the hoe: this I believe to be disastrous and that the judicious use of the natural weeds, using them as a mulch, can be made to give good results, tending to improve the soil. Planters were being taught that their object should be to keep their fields free from weeds, even when exposed to sun and to the danger of washing in heavy rains: this I believe to be wrong and I wish planters to experiment with other methods. In using weeds in the way I suggest, the planter will require to use

his judgement as to the precise manner in which the work is to be done, and modifications will, doubtless, arise to meet the various conditions encountered. It seems quite possible that the intervention of an occasional forking may prove useful.

In reference to the above, it may be of some interest to mention that the matter of orchard cultivation is being discussed by American fruit growers along somewhat similar lines.

The *Florida Agriculturist*, of September 20, 1905, devotes considerable space to what is called the 'New Horticulture,' the principles of which are diametrically opposed to the generally accepted system of fruit culture. The 'New Horticulture' advocates, among other things, the following:—

Non-cultivation after the trees begin to bear. Not neglect, but mowing often enough to keep all growth down. Until the trees begin to bear, any crop but small grain may be grown between them. Where the ground is rough and rocky and in sections of average rainfall, trees may be planted in sod, but they will grow less rapidly. A circle of about 3 feet should be hoed clean, the tree planted in a small hole in the centre, the earth around it well rammed, the circle well fertilized and mulched.

MULCHING IN CACAO FIELDS.

The value of mulches of grass and leaves in increasing the productiveness of cacao fields is very strikingly brought out by experiments conducted since 1900 at the Dominica Botanic Station, the results of which are recorded by Dr. Francis Watts in the *West Indian Bulletin*, Vol. VI, no. 3. The following extract deals particularly with the plot treated in this manner:—

The plot mulched with grass and leaves, the sweepings of the lawns at the Botanic Station, is a very interesting one. In the first period this plot, though giving a greater yield than the no-manure plot, fell far behind the plot receiving dried blood; in the second period it again exceeded the no-manure plot and was practically equal in yield to, or a little better than, the dried blood plot; while in the third period (1905) it has far surpassed all the other plots and has given a yield 66 per cent. greater than that obtained from the no-manure plot. The soil of this plot is in better condition than the others, the surface soil is moister and darker in colour, while the trees have a better surface root development.

This method of manuring by means of mulches of grass and bush is evidently the proper course to adopt in Dominica, where, owing to the large supplies of the required material which are available, the work of manuring can be carried out efficiently.

These experiments again emphasize the desirability in the tropics of following agricultural methods which lead to the conservation of humus or vegetable matter in the soil. In most cases, if these methods are conscientiously adopted, sufficient supplies of plant food will be conveyed to the soil to obviate the necessity of buying artificial manures.

It is probable that the plot mulched with grass and leaves will retain its vigour and productiveness for a much longer period than the others.

Reference is made on p. 392 to the results obtained by the application of artificial manures to plots of cacao in the same series of experiments.



GLEANINGS.

The annual Agricultural and Industrial Exhibition of the Barbados Agricultural Society was held at Harrison College on Wednesday, December 20.

The British West India Fruit Co., Ltd., have been awarded a silver medal for their general display of fruit at the Royal Horticultural Society's Show of Colonial Fruit, held in London on December 5 and 6.

There is a proposal in hand to hold the eighth Dominica Agricultural Show at Melville Hall on the Windward Coast in February next. This would be the first occasion on which the annual show has been held outside of Roseau.

In view of the efforts that are being made in Jamaica to establish a trade in preserves, it is of interest to observe that the Jamaica Preserves & Honey Co., Ltd., is advertising for young limes, guavas, young ginger, and full mangos.

It is proposed to hold a Hydrographical Congress in connexion with a Colonial Exhibition to be held in Marseilles from May to December 1906. The Congress will deal with charts, marine meteorology, marine biology, fisheries, marine laboratories, and many other related matters.

At a meeting of the Antigua Agricultural and Commercial Society, held on December 1, Dr. Watts extended an invitation to the members of the society to meet him at the Botanic Station on the following Friday for the purpose of inspecting the experiments which were being conducted there.

The Superintendent of the Botanic Station in British Honduras reports that there are several fairly large cacao plantations established in the colony. Some of these plantations are already producing good crops. On one estate a cacao-drying apparatus has been erected.

As the result of the recent Colonial Exhibition, the West India Committee were able to lend a number of West Indian curiosities and articles of interest from Jamaica, Trinidad, and Grenada, for a missionary exhibition, held in Guildford on November 14 and 15. (*West India Committee Circular*.)

As indicating the efforts that are being made at Dominica to establish a fruit industry, it is of interest to note the following items in the returns of produce shipped from the island during the period January 1 to September 30, 1905: 4,236 bunches of bananas, 12,095 barrels of fresh limes, 135,360 oranges, 16 barrels of preserved tamarinds, and mangos to the value of £217.

Under partial shading of native trees and the *Castilloa* rubber tree, a coffee plantation in the Toledo district, British Honduras, is now in a flourishing condition and bears heavily.

A school garden show was held at Princes' Town, Trinidad, on Friday, December 1. The *Port-of-Spain Gazette* states that it was, perhaps, the most successful of the three that have been held during the year. The show was opened by his Excellency the Governor, who also distributed the prizes.

Official figures with regard to the exports of Jamaica for the six months ended November 18, 1905, show large increases in the output of bananas and cocoa-nuts. The quantity of cotton shipped has jumped from 8,516 lb. to 38,484 lb. Oranges, pimento, and rum show a falling off, as compared with figures for the corresponding period of last year.

By the R.M.S. 'La Plata,' which left Barbados on December 14, there were shipped through the Imperial Department of Agriculture 1,178 bunches of bananas, 1 barrel of potatoes, and 1 barrel of yams. Messrs. H. E. Thorne & Sons, Ltd., shipped 200 crates of bananas. By the same steamer the West Indian Fruit Co., Ltd., shipped 800 packages of fruit from Trinidad.

Trinidad Council Paper No. 118 of 1905 contains particulars supplied by Wardens in regard to the destruction of the mungoose. It appears that the mungoose is numerous in only two out of the fourteen wards. In these two wards bounties are paid for the animals destroyed. In Couva 183 have been destroyed at a cost of £34 since November 1904; in Tacarigua, from March 1904 to October 1905, 2,498 at a cost of about £440. Between twenty-five and thirty were also destroyed in St. Ann's.

At a meeting of the St. Vincent Cotton Growers' Association, held on December 6, Mr. W. N. Sands suggested the desirability of members establishing rain gauges on their estates, with the view of obtaining accurate records as to the rainfall in the different parts of the island. Several members promised to adopt the suggestion. It may be mentioned that there are at present only two rainfall stations at St. Vincent, viz., at the Botanic Station and at the Agricultural School.

At the same meeting it was unanimously resolved 'that the Government be urged to pass an Ordinance for the protection of cotton growers against cotton stealing.' Speaking in reference to the above, Mr. Sands suggested that, possibly, stolen cotton from the Grenadines was responsible for the 'rogues' that had appeared in the cotton fields this season, and advised growers to see that pickers did not mix such cotton with the Sea Island cotton to make up the weight.

At a large meeting held at Montego Bay, Jamaica, on November 24, in connexion with the proposed establishment of a central sugar factory in that town, it was stated that capitalists in Canada had already subscribed £15,000 out of the £20,000 or £25,000 required for the purpose. The meeting was informed that it was necessary that some portion of this amount should be raised locally as a guarantee. The company does not propose to grow canes but to purchase them from growers.

AGRICULTURAL EDUCATION AT ANTIGUA.

The following memorandum on agricultural education at Antigua has been prepared by Mr. A. H. Kirby, B.A., Agricultural and Science Master. It serves to indicate what is being done in this connexion in Antigua:—

The scope of the work may be defined from two stand-points: that in which its general educational value is considered, and that in which its worth as a preparation for those who intend to follow agricultural pursuits is held in mind. Of these, the latter will be dealt with first, as it is the more important and direct object of the work, the other (as it has been found) being a necessary and useful concomitant of it.

At the Grammar School, by lessons in agricultural science in which the chemistry, physics, and botany, which are requisite for the understanding of the physiological processes in the plant kingdom are included, and by practical work in the school garden, a class of pupil is being produced who can, on leaving school, carry on agricultural work with a regard for scientific method, who is equipped with sufficient knowledge to follow intelligently the literature bearing more directly on his interests, and who is perforce, from his very training, averse to mere empirical methods and amenable to scientific reasoning. It is evident that the introduction of agricultural reforms among persons of this kind will be a far more speedy matter than it is among those who have not had the same advantages. In this connexion it may be mentioned that at the present time seventy-two boys are in receipt of scientific instruction. Of these, three take chemistry alone, twenty-seven chemistry and physics, fifteen chemistry and agricultural botany, twelve chemistry, physics, and agricultural botany, while fifteen of the youngest are going through a preparatory course.

While the work has been carried on as described above among those already receiving a good secondary education who may wish to specialize in the direction of agriculture, regard has also been had to the interests of the pupils in the elementary schools. Circumstances demand that these should be influenced more indirectly, and it is of course proper that they should be reached through their own teachers. With this object, courses of lectures on the elements of plant physiology and on tropical hygiene have been given to the teachers of the elementary schools in the island, and to the students of the Female Training College. By means of such lectures assistance has been given to those attending them in the preparation of object-lessons suitable for their pupils, improved methods of teaching have been introduced, and the idea has been kept before them that mere learning by rote should be superseded by methods in which the sustained interest of the pupil leads to the acquirement of knowledge by him. The importance of the work in the school garden, or that carried on by means of boxes and pots, is insisted upon, as providing a means of demonstrating practically the principles taught in class and not as being intended for the purpose of merely showing how to grow a few different crops. The necessity of such teaching to the youth of an agricultural country is too evident to require remark. The total number of those who, at the present time, are taking up these courses is forty, of whom twenty-seven are actively employed in elementary schools, and thirteen attend the Female Training College.

The other view, that of the purely educational value of such work, may now be considered shortly. Seventeen pupils from the Girls' High School attended lessons in botany, and these, of course, can only be regarded in that aspect.

At the Grammar School every boy takes up at least one science subject—chemistry. It is the opinion of those who have the care of the general subjects of the curriculum of the school that improvement in them has resulted from the introduction of science subjects, while at the same time a better tone prevails generally in regard to the modes of thought and expression. The last statement is also true of the teachers in the elementary schools, as is evidenced by the much more intelligent way in which notes of lectures are made, and by the reasonable spirit of inquiry which exists among them. It is much less easy, as far as their pupils are concerned, especially for those who do not come directly into contact with them, to gauge the effect of the work in this direction. It is fully evident, however, that it must be one of imparting the knowledge of the laws of health, and of instilling the idea that the pursuit of agriculture, especially in a country whose inhabitants depend upon it for their very existence, dignifies, and does not debase, those who take part in it.

CANADIAN EXHIBITIONS, 1906.

The following is a copy of a letter from Messrs. Pickford & Black to the Imperial Commissioner of Agriculture for the West Indies, dated Halifax, N.S., November 1, 1905:—

In addition to the annual fair held in Toronto, it is intended during 1906 to hold a Dominion Exhibition at Halifax; this latter is very largely assisted by the Dominion Government and is patronized by manufacturers and others throughout the whole Dominion. This year it was held at Vancouver and was a great success, being an attraction which drew people from all over the Dominion as well as from the United States. As far as the Toronto Show is concerned it is always very largely attended, on some days as many as 90,000 to 100,000 people passing the gates. The dates at Toronto and Halifax have been arranged so that the former Exhibition will be closed in ample time to enable the exhibits to be removed to, and shown at, the Dominion Fair at Halifax, N.S.

It has occurred to us that these exhibitions would form the very best means of placing the products and resources of the West Indies before the Canadian public, and with this end in view we are prepared to assist in every possible way. We would offer to carry all exhibits from the West Indies to Toronto, and thence to Halifax, free of charge. We will also arrange for the necessary space and the proper showing of the same. Exhibitors would thus only have to provide their exhibits and pay cost of erecting booths.

It would only be necessary to send bona fide samples of goods produced in the West Indies (not ladies' fancy work), but articles which would lead to the development of trade between the two countries.

We do not know your feelings in regard to the success of the previous exhibits, but it is our opinion that nothing has ever before been done which has so effectually brought the resources of the West Indies before the people of Canada. It is to be regretted that the exhibits stored on our premises after the exhibitions of 1904 were totally destroyed in the fire, as they would have formed the nucleus of a good show.

We would be pleased to hear from you as early as possible in regard to the above so that we can arrange space at both Toronto and Halifax and issue the necessary instructions regarding transportation.

The shows will be held in August and September, definite dates to be advised later.



TRINIDAD: ANNUAL REPORT ON THE BOTANICAL DEPARTMENT, 1904-5. By J. H. Hart, F.L.S., Superintendent.

It is reported that the nurseries have, on the whole, been able to meet the local demands for plants. The total receipts for the sale of plants and produce during the year under review amounted to £419 8s. 3½d., which is the highest return for several years past.

Several of the sugar-cane seedlings raised in Trinidad are now regularly cultivated on estates. There has been a constant demand for plants of the various rubber trees. The rubber plot at St. Clair has made excellent progress, and bleeding experiments will be carried out in the coming season. The demand for budded orange plants is reported to be steadily on the increase.

Timber and shade trees are grown in the nurseries for distribution. There is a steady demand for the 'Madura' shade tree (*Gliricidia maculata*). As regards timber trees, Honduras mahogany is being widely planted.

Owing to the attack of 'Boll rot,' the experiment in growing cotton at St. Clair was a decided failure.

The River estate was placed under the control of the Botanical Department on January 16, 1904. Careful attention to pruning, tarring wounds, etc., has resulted in a considerable improvement in the appearance of the cacao trees, and the yield has been an excellent one. A small experiment plot will shortly be started with the view of affording an object-lesson in manuring and general treatment.

A banana plantation has been established on the estate for supplying planters with suckers. There are reported to be 3,500 plants in good order.

Cacao and cotton experiment plots were started in the country districts.

BRITISH HONDURAS: REPORT ON THE BOTANIC STATION, 1904. By E. J. F. Campbell, Superintendent.

In British Honduras there are a Botanic Station at Belize and subsidiary nurseries at Stann Creek and Corosal. Owing to the absence of any period of drought during the year, the plants in the Botanic Station maintained a bright, fresh appearance throughout. The station is a favourite resort with the people of Belize.

At the Stann Creek nursery many rare and valuable economic plants are growing, which will, in time, provide abundance of seed for distribution.

At the Corosal nursery a trial was made of Sea Island cotton, but the heavy rains injured the blossoms causing them to fall. At the nursery attention is paid chiefly to short-period crops, like corn, arrowroot, ginger, etc.

The total number of plants distributed from the station during the year was 10,626; this number included 6,600 logwood and 2,144 cacao plants. The receipts from the sale of plants for the year amounted to \$327.61, showing an increase over the receipts of the previous year of \$55.80.

HAWAII: ANNUAL REPORT ON THE AGRICULTURAL EXPERIMENT STATION, 1904. By Jared G. Smith, Special Agent in Charge.

The various lines of investigation described in previous reports were continued. Co-operative experiments in cacao and banana cultivation are being carried on.

The Chemist of the station has been engaged in soil research work and has, in addition, made analyses of a large number of samples of forage plants.

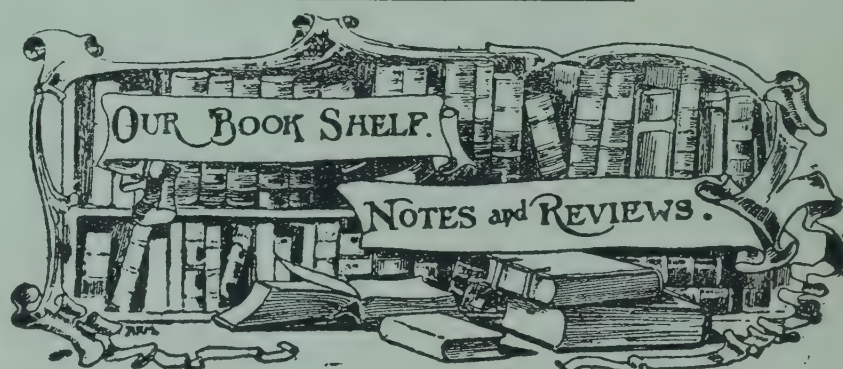
The principal work of the Horticulturist has been in connexion with the collection of bananas and in experiments in the propagation of mangos, avocado pears, etc.

Avocado pears have been shipped to San Francisco with satisfactory results. It is thought that the mango, also, is destined to take a prominent place in the American markets. An exhibit of agricultural products was prepared for the St. Louis Exposition.

The Entomologist has been engaged in investigating the life-history of numerous insect pests.

Special attention is being paid to tests of grasses and forage plants, seeds of which have been imported from various parts of the world. Information is also being obtained regarding the value of indigenous fodder plants.

A special officer is engaged in tobacco investigations. The outlook for tobacco cultivation is regarded as good, provided suitable land can be placed at the disposal of those who have sufficient capital to engage in the industry.



JAMAICA READERS, BOOK I: *Jamaica: The Educational Supply Co., Kingston, 1905.*

The *Jamaica Readers* have been specially prepared for the schools in Jamaica by Colonel George Hicks, Senior Inspector of Schools.

The introduction states: 'Here is a new book. It is made for little boys and girls who live in a beautiful land where orange and banana and cocoa-nut trees grow, and humming birds have their home. They will be pleased to find in the book the names of so many things they themselves have seen and have talked about and have heard others talk about.'

The last sentence is really the key-note to this reader. Hitherto, save for the *Tropical Readers*, West Indian teachers have been obliged to use readers which have been written for English schools. Consequently, children are often found to have learned facts with regard to plants, animals, etc., as to the appearance and nature of which they have been able to form no real idea.

Many of the subjects of the reading lessons in the *Jamaica Readers* are cultivated plants, or animals, or insects known to every child in Jamaica. Under the head of 'A Thousand Wonders' the stories are told, for example, of the introduction into Jamaica of the Guinea grass, of the uses of the cocoa-nut palm, and so on.

This little book is likely to receive a warm welcome from Jamaica teachers and should certainly be known, also, to elementary school teachers throughout the West Indies.

MARKET REPORTS.

London,—November 24, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 17, 1905; and 'THE PUBLIC LEDGER,' November 18, 1905.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 55/- per cwt.
ARROWROOT—St. Vincent, 1½d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£7 10s. to £7 17s. 6d. per cwt.
CACAO—Trinidad, 51/- to 55/- per cwt.; Grenada, 46/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·60d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 5/- to 6/- per bunch.

GRAPE FRUIT—8/- to 10/- per box.

LIMES—3/6 to 4/6 per box.

ORANGES—Jamaica, 7/- to 10/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, 38/6 to 46/- per cwt.

HONEY—25/- per cwt.; fine pale, set in tins 28/-.

ISINGLASS—West Indian lump, 2/1 to 2/6; cake, 1/4 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 1/4 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair pale, 1/3 per lb.

NITRATE OF SODA—Agricultural, £11 per ton.

NUTMEGS—74's, 10d.; 104's, 6½d.; 150's, 4d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.

RUM—Demerara, 1/1 to 1/3 per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 15/- per cwt.; Muscovado, 14/6 to 15/6 per cwt.; Molasses, 11/- to 14/- per cwt.

SULPHATE OF AMMONIA—£12 15s. per ton.

Montreal,—October 18, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00 to \$29·00; Trinidad, \$24·00 to \$25·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1·00 per 100 lb.

MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—Jamaica, \$5·50 per barrel, duty paid.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2·08 to \$2·25 per 100 lb.

—Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.

—Molasses, 89°, \$1·35 to \$1·50 per 100 lb.

—Barbados, 89°, \$1·45 to \$1·70 per 100 lb.

New York,—November 24, 1905.—Messrs. GILLESPIE BROS. & Co.

BEES'-WAX—No quotations.

CACAO—Caracas, 12c. to 12½c.; Grenada, 10½c. to 11c.; Trinidad, 11½c. to 11¾c. Jamaica 9½c. per lb.

COCOA-NUTS—Jamaica, \$27·00 to \$28·00; and Trinidad, \$25·00 to \$26·00 per M.

COFFEE—Jamaica ordinary, 8½c. to 10½c. per lb.

GINGER—Jamaica, 8½c. to 9c. per lb.

GOAT SKINS—Jamaica, 58c.; St. Kitt's, 49c. per lb.

GRAPE FRUIT—Jamaica, \$3·50 to \$5·00 per barrel; \$1·75 to \$2·50 per box.

HONEY—Jamaica, 65c. to 67c. per gallon (duty paid).

LIMES—No quotations.

MACE—27c. to 31c. per lb.

NUTMEGS—West Indian, 63's to 69's, 24c.; 70's to 80's, 20c.; 105's to 110's, 13c.; 115's to 130's, 10c. per lb.

ORANGES—Jamaica, \$3·25 to \$4·00 per barrel; \$1·75 to \$2·25 per box.

PIMENTO—4½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3½c. to 3¾c.; Muscovados, 89°, 2½c. to 3c.; Molasses, 89°, 2½c. to 2¾c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 2, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3·50 per 100 lb.

CACAO—\$9·50 to \$10·00 per 100 lb.

COCOA-NUTS—\$11·25 per M. for husked nuts.

COFFEE—\$10·50 to \$11·75 per 100 lb.

HAY—84½c. to \$1·00 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, (bunched) \$2·75 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2·50 per 160 lb.

RICE—Ballam, \$4·45 per bag (190 lb.); Patna, \$2·86 to \$2·96; Seeta, \$3·26; Rangoon, \$2·50 per 100 lb.

British Guiana,—December 6, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12½c. per lb.

CASSAVA STARCH—\$4·50 to \$5·00 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—13½c. to 13¾c. per lb.

DHAL—\$4·40 to \$4·50 per bag of 168 lb.

EDDOES—80c. to \$1·00 per barrel.

ONIONS—Lisbon, 3c. per lb. (ex store).

PLANTAINS—8c. to 32c. per bunch.

POTATOS, ENGLISH—\$2·25 to \$2·75 per barrel.

POTATOS, SWEET—Barbados, 84c. per bag.

RICE—Ballam, \$4·30 per 177 lb.; Creole, \$4·00 to \$4·10 per bag. (ex store).

SPLIT PEAS—\$5·90 per bag (210 lb.).

TANNIAS—\$1·56 per barrel.

YAMS—White, \$2·16; Buck, \$2·16 per bag.

SUGAR—Dark crystals, \$1·85 to \$1·90; Yellow, \$2·55 to \$2·65; White, \$3·75 to \$4·00; Molasses, \$1·75 to \$2·00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—December 8, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·10 to \$11·15; estates, \$11·30 to \$11·50 per fanega (110 lb.); Venezuelan, \$11·50 to \$12·25 per fanega.

COCOA-NUTS—\$21·00 per M., f o. b.

COCOA-NUT OIL—72c. per Imperial gallon (casks included).

COPRA—\$2·90 to \$2·95 per 100 lb.

DHAL—\$3·20 to \$3·25 per 2-bushel bag.

ONIONS—\$1·60 to \$1·70 per 100 lb. (retail).

POTATOS, ENGLISH—70c. to 90c. per 100 lb.

RICE—Yellow, \$4·25 to \$4·40; White, \$4·50 to \$5·50 per bag.

SPLIT PEAS—\$5·10 to \$5·25 per 2-bushel bag.

SUGAR—White crystals, \$4·50; Yellow crystals, \$2·75 to \$3·00; Molasses, \$2·75 to \$3·00 per 100 lb.

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